## SEARCH REQUEST FORM

Requestor's Name:		Serial Number:		_
Date:	Phone:		Art Unit:	·
G		•		
Search Topic:  Please write a detailed statement of search top that may have a special meaning. Give examp a copy of the sequence. You may include a	les or relevant citations, aut	hors keywords, e	tc., if known. For sequences, please attach	<b>3</b>
·				
			:	
<b>v</b>	Action Control of the			
			· · ·	
,				
			**	
			•	-
		٠		
•				
			•	
		· · · · · · · · · · · · · · · · · · ·		
	STAFF USE O	NLY		* .
Date completed: 03-25-03	994 Search		Vendors	
Searcher: Devely E. Terminal time:		STIC CM-1	IG Suite	
Elapsed time:		- Pre-S	Dialog	
CPU time:	Type of	Search - N.A. Sequen	APS Geninfo	
Number of Searches:		A.A. Sequen	ace SDC	
Number of Databases:		<ul><li>Structure</li><li>Bibliographi</li></ul>	DARC/Queste	.1

PTO-1590 (9-90)

			·
			•
			İ
·			
		·	

OM nucleic - nucleic search, using sw model

Run on:

US-10-092-880-3

Perfect score: 4937 Sequence: 1 taaatatacaagataataaa......tttaacaggttattattatg 4937 Title:

Scoring table: IDENTITY\_NUC Gapop 10.0 , Gapext 1.0

4109280 Total number of hits satisfying chosen parameters:

2054640 seqs, 14551402878 residues

Searched:

Minimum DB seq length: 0 Maximum DB seq length: 200000000

Post-processing: Minimum Match 0% Maximum Match 100% Listing first 45 summaries

GenEmbl:\* Database :

em\_fun:\* em\_hum:\* gb\_ba:\*
gb\_nr:\*
gb\_om:\*
gb\_ow:\*
gb\_ov:\*
gb\_pat:\*
gb\_ph:\* gb\_sts:\* gb\_un:\* gb\_vi:\* em\_ba:\* em\_in:\* gb\_ro:\* gb\_sy:\* gb\_pr:\*

em\_mu:\* em\_pl:\* em\_or:\* em\_ov:

em\_htg\_hum:\*

REFERENCE AUTHORS TITLE JOURNAL FEATURES Pred. No. is the number of results predicted by chance to have a em\_htgo\_other:\* em\_htg\_mus:\*
em\_htg\_pln:\*
em\_htg\_rod:\*
em\_htg\_mam:\*
em\_htg\_wrt:\*
em\_htg\_vrt:\*
em\_htgo\_hum:\*
em\_htgo\_hum:\* em\_htg\_inv:\* em\_htg\_other:\* em\_sts:\*

score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

	Description	032348 Seque	5 Sedne	9 Sedue	u, v	,, ,	6 High	₩,	0	~	-	š	I35773 Sequence 6	8 High mol	Ĕ	7 Sequenc	4 Sequenc	8 Sequenc	O,	Sequence	AR032349 Sequence	e Sednen	0 Sednen	š	Sequence 5		7 High mol	4 Haemophi	Sednence	o c	7 0	2 6	מַ מַ	ARO83958 Sequence 0	0		Control C	3 0	Seducine	/ equence	292 Methanos	23042 Mus	ST/8/ Wus mus	31814 Mouse	15 Mouse	384	
		AR032348	395	589	125182	7	$\sim$	87	235	395	90		73	35	387	34	AR083954	589			AR032349	395	9		72	35	35	94	395		ה מ	5,	125100	ď	י ני	$\sim$	0 0	75105	0 1 1 0	35//4	3292	AC 123	1787	318	AL59041	384	
	DB	9								9																		Н	9	9						o v	ט כ	o u	0 (	۰ م	٠,	0 .	7	10	10	7	
	Length	493	33	33	33	5	33	98	22	32	32	32	32	32	22	Π	7	11	급	1	17	17	17	17	17	0.2	Ξ.	92	80	4803	2 5	2 5	2 6	> 0	, ,	, 0	3 6	9 0	7 (	425	1007	7785	2580	1082	73	9038	
œ	ery	100.0	00	00	00	00	00	٠ م	ζ.	7	ζ.	7	7	7	₹.	4	ψ.	₹.	4	4	ζ.	ď	ď	ď	ď	÷.		ω.	ď.	45.5	4.	4.		4 C	> c	n a	h c	n d	ν.	٠							
	Score	:	~	~ .	~ 7	9	935	00	820	820	820	820	820	48	689	680	680	680	$\circ$	680	ī	īŌ	iŌ	in	25	a.	25	œ	246	225	707	NO	707	202	0 10	n u	7 7	7 7	7.0	4.76	Ť	m	m	0	æ	æ	
	sult No.	ļ	2	m	4 1	ς,	91	7	œ	6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	200	2,0		000	0 0	\ o	D (0		c 40	4	42	43	44	c 45	

ALIGNMENTS

linear PAT 29-SEP-1999

DNA

AR032348 4937 bp Sequence 3 from patent US 5869065. AR032348.1 GI:5947953 Unknown. RESULT 1
AR032348
LOCUS
DEFINITION
ACCESSION
VERSION
KEYWORDS SOURCE

Unknown. Unclassified.

1 (bases 1 to 4937)
Barenkamp, S.J. and St. Geme, J. William. III.
High molecular weight surface proteins of non-typeable haemophilus Patent: US 5869065-fA 309-FEB-1999;
Location/Qqalifiers

	0;																
source 14937 /organism="unknown" ASE COUNT 1729 a 948 c 1009 g 1251 t	Query Match 100.0%; Score 4937; DB 6; Length 4937; Best Local Similarity 100.0%; Pred. No. 0; Matches 4937; Conservative 0; Mismatches 0; Indels 0; Gaps 0	1 TAAATATACAAGATAATAAATAAATGAAGATTTTTGTGATGACAACAACAATTACAA 60 	61 CACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCCGCCATAT 	// 121 AATGGTATAATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCAT 180 	/ 181 CTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT 240	/ 241 CACATGAAATGATGAACGAGGGAAGGAGGGGGGGAAGAAGAAGAGGGGGGGG	301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCGTGAGAAAATATGAACAAG 360 	361 ATATATCSTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420 	421 CGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480 	481 CACTTAGGGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 540	541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGGTAGTACACGGCACGGCACACTATG 600 	601 CAAGTACATGGTAATAAAACCATTATCGCAACAGTGTTGACGCTATCATTAGTTGGAAA 660 	661 CAATTTAACATCGACCAAAATGAAGTGCAGTTTTTACAAGAAAACAACACTCCGCC 720 	721 GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780 	781 GGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840 	841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900 	901 TTCACCTTCGAGCAAACCAAGGTAAAGCGCTGGAAATTGTGAATCACGGTTTAATT 960 
78 O		Qy Dp	Qy Db	Oy Dp	oy G	Qy Db	Qy Db	Qy Dp	QQ Dp	Oy Dp	QY Db	qa ob	QY Db	QY Db	Qy Dp	Qy Db	Qy Db

TG 1020    TG 1020	AT 10 	3 114	A 120	126	 	CTT 1380      CTT 1380	ਜ ਜੇ ਪ=ਪ	GC 1500     C 1500	r 156     156	r 162     162	168	rc 1740       1740	A 180	186	9 9	198	20 20	GC 2100
CGAGGGTG               CGAGGGTG	<u> </u>	GGTCAAT  - - - - GGTCAAT	TCGAAAC 	TCTTTCC 	CAAGCTAAAGGC 	rcgac 	AGGTAAAAA(             AGGTAAAAA	rgtatcag         rgtatcag	GCCAAT        GCCAAT	66660 1111 66660	ACCCTG	rgatgaatt                GATGAATT	AAAACAACGC 	9-9	TAATTCTCC             TAATTCTCC	AGGC 1 - 1 - 1	CTTGATCAC	AAAGCAC
AGTGAAAAAC 		9-9	CTA	TATT	9 - 9	STGCA	CGCGGCGAA(              CGCGGCGAA(	CAACCATCAAT	PAATTG        FAATTG	STGGAGAC            STGGAGAC		GGTATAAATC              GGTATAAATC	GAACTCAA!            GAACTCAA!		CCCACT	TTACTT 	AATATTACGO	GGAAATAAC
TGGTGGCAAAC                TGGTGGCAAAC		5=5	CCGTG	AAAGCGG	CCGCT	TAAAAACAGG TIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	GTGACGAGG              GTGACGAGG	SGCT 1	5 – 5	GTGGTT 	CAAAAGA                 CAAAAGA	FAATAC        FAATAC	CCTAAAAAAATAGC 	CCTGGAC             CCTGGAC	GAAGCAACT	ATGGAC ATGGAC	TTCATA	NGGT
CTTAT	CTTTACTC(            CTTTACTC(	CATTGCC	CATTAAT 	GCAAAGATA                GCAAAGATA	GTGTAATTT            GTGTAATTT	AAAGTCACAT' 	TACCTTGGCG	CTTTAGAAAAAG 	GTGGGGG            GTGGGGC	CTAAAACCG	5 - 5	CCCCTTCGCAA:	CCCTAAAA	GAAAAACG              GAAAAACG	AACATCC	TCAGATTC            CAGATTC	GGTTGATG          GGTTGATG	CGTAGCTT
CAGTGTAAATC 	CAGCATTT              CAGCATTT	TTACTTACAGG	AGGCGGTAA(               AGGCGGTAA(	TCTGTAA 	ATTGGCG 	GCCAT	AGAAACTT	AGCAAAGAAAACCTC 	CGCTATTGT 	GATATCG 	CAATGCAATS	CGAAGACCC                CGAAGACCC	GCAAGCGACC	AATTATCT           AATTATCT	AGCTCAATC	GGAGGCGT	GGCGGATG 	GCCGCTTC
AAAGACGG                   AAAGACGG	TAAATGGTGG                TAAATGGTGG	CCAACCA            CCAACCA	TTTGCCAAAC             TTTGCCAAAG	TCTGCTGAT            TCTGCTGAT	gaageggaai              gaageggaai	ATGATTACAC                ATGATTACAC	AAGGGGG AAGGGGG	1111	ÿ <b>–</b> ÿ	GGTAGTGGT          GGTAGTGGT	ATTGACAGO 	AATTGAAGCC	5-5	CTATTTCA. 	ACCGTTAAT                ACCGTTAAT	U - U	4 – 4	ATATTACC
ACTGTCGGT.	ATTAGCGTA              ATTAGCGTA	ATAATAAAC               ATAATAAAC	GGCGATATT              GGCGATATT	GGTAAACTT               GGTAAACTT	AAAGAGGT             AAAGAGGGT	GGCAAGCTG           GGCAAGCTG	CAGGTAAAG                CAGGTAAAG	GGCATTCAA'               GGCATTCAA'	AAAGAAAAAG                AAAGAAAAAA	AACGCTCAA(              AACGCTCAA(	ATTTATCC               ATTTATCC	ATGTAAC              ATGTAAC	CAACAGG             CAACAGG	ACCAATACAA(              ACCAATACAA(	GAAAACTT 	STAAAGGT          STAAAGGT	AATTTAACCA              AATTTAACCA	TTTA
961 7	21	81	1141 (	1201	1261 A	1321 G	1381 T   1381 T	1441 G	1501 A	1561 A       1561 A	1621 T	1681 G	1741 C 1741 C	01	4 - 4	921 A   921 A	81	2041 G
Qy	Qy	Qy	Qy	Qy	Qy	Qy	QY	Qy	Qy	Qy	Qy	Oy Db	Qy	Qy Db	Oy Dp	O <sub>Y</sub>	Qy	Qy

0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0		00	09	20	80	40	00	09	20	80
210(	216 216	222	228	234	240	246 246	252	258 258	264 264	270	276	282	28	29	30	30	31	31
	IGTAACCATT	TTAAACGGAACGGGTAAAGGTCT 	CTTAGTGGCACAATTAACATAI 	GAGAAAGAACACCTGGTATTGGCAAACCAGC 	NGAGACAGGCGCAAATTTTACCTTTATT 	AAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGT 	STCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTC. 	AAGCAAACCTTTACCAATTCGG 	GGGCTCTGTTTTTTTGATATATGCCAACCATTCTGG 	ATGAGTGAAATTAATATCTCTAACGGCGCTAATT 	CTTTTAAAATCAACAAAGACTTAACCATAA 	ITTCAGCCTCAGACAGACGAAAGATGATTTT 	ATATCCATTCTGGG 	ATATTACTATCGAGAAAG 	AATAACGCCCCTAATCAGCAAAACATAAGGGATAGATATAAAACTTGGCAGCTTGCTC	aactggggaaaatgcagat 	TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCC 	ACCAATAATGGCACTGCCGAAATTAATATAACACAAAGGAGTGGTAAAACTTGGCAATGTT
2041	2101	2161	2221	2281 2281	2341	2401	2461	2521 2521	2581 2581	2641	2701 2701	2761 2761	2821 2821	2881	2941	3001	3061 3061	3121
q	oy Ob	Qy Dp	Qy Dp	Qy Db	Oy Db	Qy	Qy	Oy Db	Qy Db	Qy	Qy Db	Qy Db	QY	Qy	Qy	Qy	Qy	Qy

18	3240	3300	3360 3360	3420	3480	54	3600	3660	3720	3780 3780	3840	3900	3960	4020	4080	4140	4200	4260
1 ACCAATAATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGCAATGT	1 ACCA 	1 GGCGGAGATATAATCAACAAAAAAGG 	1 GAAATCCAAATTGGCGGCAATATCTCGCAAAA 	1 AAAATTAATATCACCCAAACAGATAAC 	1 TCAGATGCGACAAGTAATGCCAACCTAAC	CAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAAACCAAAGTAGTAACTAAGTAATTACAGCCAAAGTAGGTACAACTAAGTAAAGTAAAGTAAAAAAAA	ATTGGCAACAGTAATGAC                     ATTGGCAACAGTAATGAC	01 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 	ACATCTAGCAGCAA 	21 ATTACTGCAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC 	91 ACCGCGTCGGAAAAGGTTACCACCACAGCGGGTCGACCATTAACGCAACAAATGGCAAA	41 GCAAGTATTACAACCAAAACAGGTGATATCA( 	01 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAA 	61 GAGGCTAATGTA/ 	1 AATGTTAGGGAAAGGCTGGGGATTTAACAGTTGGAATGGGGAGTGCTAG 	81 GAAGGAGCTGCAACCT 	41 ATCACTTCAACTAAGGTCAGGTAGACCTCTTGGCTC	01 ATTAATGCTGCTAATGTGACATTAAATAC 
312	318	324	330	336	4	342 348 348	354	360	9	37.3	378		36	39		4 4	41	42
qq	Qy Dp	Qy	Qy	QY	δλ	ga & ga	Qy Db	Qy Db	QY Db	Qy Db	Qy	Qy Dp	Qy Db	QY Db	QY Db	QY Db	QY Db	Qy

AGGCTAAATGGT 4320  Db 1 TAAATATACAAGATAAAATAAAATAAAAATAAAAATAAAATAAAAATAAAAA	4440 Oy 121 4440 Db 121	AAATTGAGGTG 4500 QY 181 CTTTCATCTTTTCATCTTTTTCATCTTTTTCATCTTTTTCATCTTTTTCATCTTTTTCATCTTTTTT	AACGCGTCCTT 4560 QY 241 CACATGAAATGATGAACCGAGGGAAGGG	TTGGTGTAAGT 4620 QY 301 GAACGCAAATGATAAGTAATTTAATTG	ATGAATTTACA 4680 OY 361 ATATATGTCTCCAAATTCAGCAAACGCC	CAAGTGGTAAT 4740	4800 Cy 481 4800 Db 481	4860 Qy 541 4860 Db 541	4920 QY 601 4920 Db 601	Qy 661 CAATTTAACATCGACCAAAATGAATGG 	QY         721 GTATTCAACCGTGTTAACATCTAACCAAA:           BD         721 GTATTCAACCGTGTTACATCTAACCAATI           CQY         781 GGACAAGTCTTTTAATCAACCCAATGGCTAGAATGGCTAATCAACCCAAATGGCTAGAATGCTTTTAATCAACCCAAATGGCTAGAATGCTTTTAAATCAACCCTAATGAATG	Db 841  Qy 901  Db 901	Qy 961 ACTGTCGGTAAAGACGGCAGTGTAAATCT	CY 1021 ATTAGGGTAAATGGTGGCAGCATTTCTTT
4261 GATATTAAAGCAACCAGCGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4321 GATGCTAGTAGTAGTAGAAGTGAAGGTGAATGGAGCGAAGGGGCTCTGGTAGTGGT 6321 GATGCATCAGGAGTAGAAGTGAAGGAGTCAACGCAAGCGGCTCTGGTGGTG 6321 GATGCATCAGGAGTAGAAGTGAATGCAGTGAAGCGAAGC	381	AATATCATTTCGAA 	4501 AAATATACCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGGGAAACGCGTCCTT 	561 GAAAAGTAAAAGA 		4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGCGTGTTTCTCAAGTGGTAAT	4741 GGCGCACCACTATGTACCAATGTTGCTGACGACGGCGGTAGTCAGTC	4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 		4921 AACAGGTTATTATG 4937 	SULT 2 083955 CUS AR083955 FINITION Sequence 3 from patent US 5977336. RSION AR083955 GI:10010726 RSION AR083955.1 GI:10010726 UKNORDS UNKNOWN.	ENCE 1 (bases 1 to 4937) HORS Barenkamp, S.J. LE High molecular weight surface proteins of non-typeabl RNAL Patent: US 5977336-A 3 02-NOV-1999; LOCATION/Qualifiers Source	/organism="unknown" Junt 1729 a 948 c 1009 g 1251 t	7; DB 6; Leng 0; hes 0; Inde
Oy Oy	Qy Db	Qy	Oy Db	Qy Db		oy Op	Qy Dp	Oy Op	, do	Oy 4 Db 4	AROB3955 LOCUS LOCUS DEFINITION ACCESSION VERSION KEYWORDS SOURCE ORGANISM	REFERENCE AUTHORS TITLE JOURNAL FEATURES	BASE COUNT ORIGIN	Ouer Best Matc

```
240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      TATTTTAAAAAAATAGTATAAATCCGCCATATAA 120
                                                     300
                                                                                                                                                                                                                   GTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                 420
                                                                                                                                                                                                                                                                         TACTCGCAGGGCAAAAATCACCATCAGCGAT 1080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GAGGGAGGGCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                        GTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                                                        GGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                    ATGTTACTATCTTTAGGTGTAACATCTATTCCA 540
                                                                                                                                                                                                                                                                                                                                                                                                                GGAATGGATGTAGTACACGCCACAGCCACTATG 600
                                                                                                                                                                                                                                                                                                                                                                                             GGAATGGATGTAGTACACGCCACAGCCACTATG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                       CGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                   GTGCAGTTTTTACAAGAAACAACAACTCCGCC 720
          TCAAGATTTTGTGATGACAACAACAATTACAA 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GTGCAGTTTTTACAAGAAACAACAACTCCGCC 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        3GTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SACATTTCTAACGAAAACATCAAGGCGCGTAAT 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            SCGCTCGCTGAAATTGTGAATCACGGTTTAATT 960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ATCTTTCATCTTCATCTTTCATCTTTCATCTTT
                                                                                                                                                                                                                                                               CTGAATGCTTTGGTTGCTGTCTGAATTGGCA
```

λα	1081	4 4	
3 2	14	GGATATTTTGCCAAAGGGGTAACATTAATGTCCGTGCTGCCACTATTGGAAACCA 12	
a A	20 20 20	AAACTTICTGCTGATTCTGTAAGGAAGGTAAAAGGGGGAATATTGTTCTGTTCGGC 126	
Qy Db	26	AAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 132 	
ογ		TGATTACAGGCGATAAAGTCACATTAAAACAGGTGCAGTTATCGACCTT 13 	
Qy Dp	1381	4 4	
Qy Dp	1441		
Oy Dp	1501	9	
Oy Dp	1561	AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT 1620 	
Qy Dp	1621	TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680 	
Oy Db	1681 1681	GATGTAACAATTGAAGCCGGAGACCCCTTCGCAATAATACCGGTATAAATGATGAATTC 1740 	
Qy	1741	0	
Qy	1801	AACGCCTGGACAATGAATATAACGGCATCA 1	
Oy Dp	1861	CAACATCGGAAGCAACTCCCACTTAATTCTCCAT 192 	
Oy Db	1921 1921	AGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA 1980	
Qy Db	1981 1981	AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 2040	
Qy	2041	GGTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 2100 	
Qy Dp	2101	GACGCGCAAATGCTAAAATTGTCGCCCAGGCACTGTAACCATTACAGGAGGGAAAA 2160 	
ōλ		ATTTCA 222	

|--|

3300 3360 3420 3420 3480 3480	54 60 66 72	3720 3780 3780 3840 3840	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4140 4140 4200 4200 4320 4320 4380
GGAGATATAATCAACAAAAAGGAAGCTTAAATTTACAGACAG		AAAACATCTAGCAAAAATGCGGGACGTGAAAGCAATAGCGACAACGATACCGGCTT ATTACTGCAAAAAATGTAGAAGTAAAACAAAGATATTACTTCTCTCAAAACGTAAAA		GAAGGAGTGCAACCGCAACGGAATACCTTGACTACTGAGGGGTCTTGGC
324: 330: 336: 336: 342: 342: 342: 342:	48 54 60 66	3661 3721 3721 3781 3781 3841	90 90 90 90 90 90 90 90 90 90 90 90 90 9	4081 4141 4141 4201 4261 4261 4321
0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Oy Oy Oy Oy	

```
PAT 08-AUG-2001
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ;
0
                                                                                                                                                                                                                                                                                                                                                                                                                     of non-typeable haemophilus
        4620
                                                                                                                                                         4740
                                                                                                                                                                       4740
                                                                                                                                                                                                                      4860
                                                                                                                            4680
                                                                                                                                          4680
                                                                                                                                                                                        4800
                                                                                                                                                                                              4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  9
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 9
ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAAACACAGTAAATGGGTTA
                                                           AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG
                                                                                                                                                       ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT
                                                                                                                                                                GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  .
0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  6; Length 4937
                                                                                                                                                                                                                                                                                                                                        linear
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Indels
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ;
0
                                                                                                                                                                                                                                                                                                                                        DNA
                                                                                                                                                                                                                                                                                                                                                                                                    1 (bases 1 to 4937)
Barenkamp, S.J.
High molecular weight surface proteins
Patent: US 6218141-A 3 17-APR-2001;
Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   DB
                                                                                                                                                                                                                                                                                                                                                                                                                                                           1251 t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 100.0%; Score 4937;
100.0%; Pred. No. 0;
iive 0; Mismatches
                                                                                                                                                                                                                                                                                                                                   4937 bp
Sequence 3 from patent US 6218141.
ARI45899
ARI45899.1 GI:15109088
                                                                                                                                                                                                                                                                                                                                                                                                                                                  /organism="unknown"
                                                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                           1009
                                                                                                                                                                                                                                                                                 4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                          948 c
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Best Local Similarity 100. Matches 4937; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                          .4937
                                                                                                                                                                                                                                                                                                                                                                                            Unclassified
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                          1729 a
                                                                                                                                                                                                                                                                                                                                                                            Unknown.
                                                                                                                                                                                                                                                                                                                                                                                     Unknown
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Query Match
                                                                                                                                                                                                                                                                                                                                             DEFINITION
ACCESSION
                              4441
                                                                           4501
                                                                                                          4561
                                                                                                                                                       4681
                                                                                                                                                                      4681
                                                                                                                                                                                     4741
                                                                                                                                                                                                                                                                                                                                                                                    ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                           AUTHORS
TITLE
JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                           BASE COUNT
4381
                                                                                                                         4621
                                                            4501
                                                                                           4561
                                                                                                                                        4621
                                                                                                                                                                                                                                                                                                4921
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             61
                                                                                                                                                                                                                                                                                                                      RESULT 3
AR145899
                                                                                                                                                                                                                                                                                                                                                            VERSION
KEYWORDS
SOURCE
                                                                                                                                                                                                                                                                                                                                                                                                    REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              61
                                                                                                                                                                                                                                                                                                                                                                                                                                   FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ORIGIN
             qq
                             δ
                                           q
                                                           δ
                                                                          qq
                                                                                          ò
                                                                                                       Q
                                                                                                                        δλ
                                                                                                                                      q
                                                                                                                                                      ŏ
                                                                                                                                                                      q
                                                                                                                                                                                     ŏ
                                                                                                                                                                                                   qq
                                                                                                                                                                                                                    ŏ
                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                 Dρ
                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            QQ
```

	3GGAGCTGAA ATATGAACAA ATATGAACAA TATGAATTGGC 1111111111111111111111111111111111	ANCTATTCCA 54 CATCTATTCCA 54 CATCTATTCCA 54 CAGCCACTATG 60 CACCACTATG 60	AATTGGAAA 66 AAACTCCGCC 72 AACTCCGCC 72 AACTCTAC 78 AATTATTAAC 78 AATTATTAAC 84	ATTAAC CGTAAC CGTAAC TTAAT TTAAT	AACGAGGGTGTG 1020 ACCATCAGCGAT 1080 ACCATCAGCGAT 1080 ACCATCAGCGAT 1180 GGGGTCAATCTG 1140 GGGGTCAATCTG 1140 ATTCGAAACCAA 1200 ATTCGAAACCAA 1200 ATTCGAAACCAA 1200 ATTCGAAACCAA 1200
AATGGTATAATCTTTCATCTTTAATCTTTCATCTTTTCATCTTTTCATCTTTTCATCTTTTTT		CTTAGGGTTAAAGCCACTTTCGGGTATGTTACTTTGGGTGT   CTTAGGGTTAAAGCCACTTTCGGGTATGTTACTTTAGGTGGTGT   CTTAGGGTTAAAGCCACTTTCCGGTATGTTACTATCTTTAGGTGT   CTTAGGGTTAAAGCCACTTTCCGGTATGTTACTATCTTTAGGTGTGTATGTTTTAGGAAGGGTGTTACAAGGAATGGATGTAGTAGATGAGAAGGGATGTTTTAGGAAGGAATGGATGTAGTA		AAGTCTTTTAATCACCCAAATGGTATCAATTA AATGGCTTTACGGCTTCACGCTACCAATGCTTCTAAC AATGGCTTTACGGCTTCTACGCTAGACATTTCTAAC AATGGCTTTACGGCTTCTACGCTAGACATTTCTAAC ACTTCGAGCAAACCAAAGATAAAGCGCTCGCTGAA HIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	######################################
21 21 21 81 81 41	41 01 01 61 61		0 0 0 0 0	781 841 901 901	961 1021 1021 1081 1081 1141
00 O O O O O O O O O O O O O O O O O O		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0 Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q Q	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

CC 12	GC 1321 	TT 13	AC 144 	GC 150     GC 150	TT 15    TT 15	AT 162 	AT 168	TC 174	TA 180	CA 186	AT 192	SGA 19	2AG 204 111 2AG 204	36C 210	AAA 216       	rca 22           22	ACA 22	ATGATTCGCACTGG 2340
AAAGATAAAAGCGGCAATAT 	GTAATTTCCGCTCAAAATCA 	GTCACATTAAAAACAGGTGC 	CTTGGCGGTGACGAGCGCGG 	TTAGAAAAGGCTCAACCAI                    TTAGAAAAGGCTCAACCAI	TGGGGCGATATTGCGTTAAT 	AAAACCGGTGGTTTTGTGGA 	GTTAAAACAAAAGAGTGGTJ 	CTTCGCAATAATACCGGTA) 	hacaggcaccggtgaagcaagcgacctaaaaaaatagcgaactcaaaacaagg 	haaaacgcctggacaatga 	AACATCGGAAGCAACTCCC/ 	CAGATTGATGGAGATATTA( 	GTTGATGTTCATAAAAATA' 	CGTAGCTTTGAAGGTGGAA. 	CCAGGCACTGTAACCATTA 	aacggaacgggtaaaggtc 	ragtegcacaattaacatat 	CTCGTATTGGCAAACCAGCC
TTCTGCTGATTCTGTAAGC                    TCTGCTGATTCTGTAAGC	TGAAGCGGAAATTGGCGGT 	GATGATTACAGGCGATAAA 	AGAAGGGGAGAAACTTAC 	ATTAGCAAAGAAAACCTCT 	AGGCGGACGCGCTATTGTG 	AGGTAGTGGTGATATCGCT 	CATTGACAGCAATGCAATT 	AATTGAAGCCGAAGACCCC 	CACCGGTGAAGCAAGCGAC 	AACTATTTCAAATTATCTG 	TACCGTTAATAGCTCAATC                     TACCGTTAATAGCTCAATC	TCAGCGTGGCGGAGGCGTT 	CATTATTCTGGCGGATGG 	AAATATTACCGCCGCTTCC 	AAATGCTAAAATTGTCGCC 	GGCTAACAACGTATCTTT# 	ATAATTTAACCCACAATCT7 	AAACTACGAGAAAGAACAC
GGTAAACT 	AAAGAGGG               AAAGAGGG	GGCAAGCT(             GGCAAGCT(	TCAGGTAA.           TCAGGTAA.	GGCATTCA.               GGCATTCA.	AAAGAAAAAGGC	AACGCTCA               AACGCTCA	TATTTATC            TATTTATC	GATGTAAC           GATGTAAC	CCAACAGGC		AGAAAACT            AGAAAACT	AGTAAAGG             AGTAAAGG	AATTTAAC              AATTTAAC	GGTTTTTT 				ATTAACC
1201	61	1321	81	1441	01	561 561	621 621	681 681			1861	1921	1981	4 4	0	16 16	2221	
Oy Dp	Oy Db	Qy	Qy	QY	QY	Qy	Qy	Qy	Qy Db	Qy	Qy	QY	Qy Db	Qy Db	Qy	Qy Db	Qy	Qy

25

Tue Mar

۵	2281		2340
	2341	AACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTACCTTTATTAAATACATTTCA 	2400
	2401	CTG 	2460
	2461 2461	GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAA 	2520 2520
	2521 2521	CCAAACGAGAACATGAACACAAGCATTAACCAATTCGGTTTTTAGCCAATATCACA	യ യ
	2581	NTATATATGCCAACCATCTGGC 	وَ وَ
	2641 2641	GAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT 	2700
	2701 2701	AAAGACTTAACCATAAA 	2760
	2761 2761	AATTCAGCCTCAGACAAAGATGATTTTATGACGGGTACGCACGC	2820
	2821	AATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCA	2880
	2881	FTACTATCGAGAAAGCAGAAATGTTACGCTAGAAGCC 	2940
	2941	AATAACGCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC : 	3000
	3001	GTFAATGGGAGTTFAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT : 	3060
	3061	TCAGAAAGGGCCACTTTAAAGGAAAGACTAGAGATACCCTAAATATCACGGGCAATTTT : 	3120
,	3121	ACCAATAATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGCAATGTT : 	3180 3180
1.7 (1)	3181	ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC : 	3240
(*)	3241 ( 3241 (	GGCGGAGATATAATCAACAAAAAGGAAGCTTAAATATTACAGACAG	3300
(1) (1)	3301 (	BAAATCCAAATTGGGGGAATATCTCGCAAAAGAAGGGAACCTCACGATTTCTTCCGAT 3 	3360 3360
(*)	3361 /	AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGGGCTCCTAGT 3	1420

```
TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA 3480
                                                     GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGTTACAGCCAAAGATGGTAGAGATTTA 3540
                                                               3720
                                                                                                                                                                                                      3780
3361 AAAATTAATATCACCAAACAGATAACAATCAAAAGGGTATTGATGGAGAGGACTCTAGT 3420
                                                                                        ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3600
                                                                                                                                3660
                                                                                                                                                                                                            3900
                                                                                                                                                                                                                                                                                              3900
                                                                                                                                                                                                                                                                                                                                                   4020
                                                                                                                                                                                                                                                                                                                                                                                     4080
                                                                                                                                                                                                                                                                                                                                                                                                                         4140
                                                                                                                                                                                                                                                                                                                                                          4200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4440
                                                                                                                                                                                                                                                                                                                                                                                                                                                            4200
                                                                                                 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT
                                                                                                                                                                                AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT
                                                                                                                             AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG
                                                                                                                                                                                                  3721 ATTACTGCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC
                                                                                                                                                                                                                                       ACCGCGTCGGAAAAGGTTACCACCACAGCAGGCTCGACCATTAACGCAACAAATGGCAAA
                                                                                                                                                                                                                                                                         GCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAAGT
                                                                                                                                                                                                                                                                                   GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA
                                                                                                                                                                                                                                                                                                                                                                                                                                                        AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA
                                                                                                                                                                                                                                                                                                                                                                                                                      GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC
                                                                                                                                                                                                                                                                                                                                                                                                                              ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAAACCACCGTGGCAGGCTCG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GATATTAAAGCAACCAGCGCACCTTGGTTATTAACGCAAAAGATGCTAAAATGGT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAAACACAGTAAATGGGTTA
                                                                                                                                                                         3421
                                   3421
                                                                      3481
                                                                                                          3541
                                                                                                                                             3601
                                                                                                                                                               3661
                                                     3481
                                                                                        3541
                                                                                                                            3601
                                                                                                                                                                                 3661
                                                                                                                                                                                                                     3721
                                                                                                                                                                                                                                                                         3841
                                                                                                                                                                                                                                      3781
                                                                                                                                                                                                                                                                                                             3901
                                                                                                                                                                                                                                                                                                                              3901
                                                                                                                                                                                                                                                                                                                                                3961
                                                                                                                                                                                                                                                                                                                                                                3961
                                                                                                                                                                                                                                                                                                                                                                                  4021
                                                                                                                                                                                                                                                                                                                                                                                                    4021
                                                                                                                                                                                                                                                                                                                                                                                                                      4081
                                                                                                                                                                                                                                                                                                                                                                                                                                      4081
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4261
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4201
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     4321
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4261
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4321
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4381
                οχ
                                  Dp
                                                    Q
                                                                    Db
                                                                                        δy
                                                                                                         qq
                                                                                                                           ò
                                                                                                                                           Dp
                                                                                                                                                               ŏ
                                                                                                                                                                                g
                                                                                                                                                                                                                   Dp
                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                  ŏ
                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                         οy
                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                               Q
                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                   q
                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                     QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Db
```

4500

```
Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                            οp
                                                                                                                                                                                                                                                                                                                                                                                                                                              οy
                                                                                                                                                                                                                                                                                                                  QQ
                                                                                                                                                                                                                                                                                                                                                      pp
                                                                                                                                                                                                                                                                                                                                                                          _{\rm Q}
                                                                                                                                                                                                                                                                                                                                                                                                              Ω
                                                                                                                                                                                                      a
                                                                                                                                                                                                                                           QQ
                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                  Qγ
                                                                                                                                                                                                                                                                                                                                      δý
                                                   αq
                                                                      QY
                                                                                       QQ
                                                                                                          οy
                                                                                                                            g
                                                                                                                                               QY
                                                                                                                                                                Ω
                                                                                                                                                                                   δ
                                                                                                                                                                                                                         δ
                                                                                                                                                                                                                                                              δy
               qq
                                 ŏ
                                                                                                                                                                                                                                                                                                                                                           CE 1 (bases 1 to 4937)

RS Barenkamp, S.J. and St. Geme, J.W. III.

High molecular weight surface proteins of non-typeable haemophilus

AL Patent: US 5549897-A 3 27-AUG-1996;

Location/Qualifiers

1. 4937

VT 1729 a 948 c 1009 g 1251 t

atch

atch

atch

231 Similarity 100.0%; Score 4937; DB 6; Length 4937:

4937; Conservative n. ....
                                                                                                                                                                                                                                                                                                                              linear PAT 07-OCT-1996
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                      GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                     GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                         GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAAGTATTTT 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            61 CACCTITITIGCAGICTATAIGCAAATATITITAAAAAATAGTATAAATCCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      61 CACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAAAAACGCCCATATAA 120
4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
          4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAAACTTGGTGTAAGT
                                                                                                                                                                                                                                                                                                                                DNA
                                                                                                                                                                                                                                                                                                                          4937 bp
Sequence 3 from patent US 5549897.
125182
125182.1 GI:1605052
                                                                                                                                                                                                                                                                 4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                  4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Best Local Similarity 100.8
Matches 4937; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                         source
                                                                                                                                                                                                                                                                                                                                          DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                       ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                     JOURNAL
                                                                                                                                4681
                                                                                                                                                                                                                                                                                                                                                                                                                     AUTHORS
                                                                                                                                                   4741
                                                                                                                                                                                       4801
                                                                                                                                                                                                                                                                                                                                                                                                          REFERENCE
                                                                                                                                                                                                          4801
                                                                                                                                                                                                                                                                                                               RESULT 4
I25182
                                                                                                                                                                                                                                                                                                                                                    ACCESSION
                                                                                             4621
                                                                                                               4681
                                                                                                                                                                                                                                                                                                                                                                      KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                               FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                               TITIE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ŏ
                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                             pp
                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                  qq
                                                                                                                                ОР
                                                                                                                                                                   QQ
                                                                                                                                                                                       δ
                                                                                                                                                                                                        В
                                                                                        qq
                                                                                                              ò
                                                                                                                                                  δ
                                      ò
                                                     qq
                                                                          δλ
```

```
1201 GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1141 GGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA 1200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             961 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGTGTG 1020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1021 ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACCATCAGGGAT 1080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       099
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          781 GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900
                                                                                                          541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600
                                                                                                                                                                                                                                                                                                          541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600
                                                                                                                                                                                                                                                                                                                                         601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                               661 CAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                     GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAAGGGATTTTAGATTCTAAC 780
              301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                    241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGCAAGAATGAAGAGGGGGGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCCTGAAAATGAAGCGGTCAATCTG
                                                                                                                                                                                                                                                                                                                                                      721
```

							•											
1380	144	0 0	1560	62	689	7 7	0	86 86	0 0	ão ão	4 4	10	2160 2160	2220	2280	2340	2400	46
321 GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 	81 TCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACGAGGGCGCGGGAGGTAAAAA 	41 GGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTA 	AGAAAAAGGCGGACGCGCTATTGTGT 	61 AACGCICAAGGIAGIGGIGAIAICGCIAAAACCGGIGGITITGIGGG 	21 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTG 	81 GATGTAACAATTGAAGCCGAAGACCCCTTCGCAATAATACCGGTATAAA 	41 CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAAATAGCGAACT 	01 ACCAATACAACTATTTCAAATTATCTGAAAAAGGCCTGGACAATGAATATAACGGCATC 	61 AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCC 	TACTTCTAAAGGCG 	KGTTCATAAAAATATTACGCTTGATCA 	41 GGTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 	01 GACGCGCAAATGCTAAAATTGTCGCCCAGGGCACTGTAACCATTACAGGAGGGAAAA 	61 GATTICAGGGCTAACAACGIATCTTTAAACGGAACGGGTAAAGGICTGAATATCATTTCA 	21 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA	1 ATTAACCAAACTACGAGAAAGAACACCTGGTAT 	1 AACGTCACTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAA 	1 AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGG
H H	7 7	ਜੇ ਜੇ		. 15	16	16	17	18	18	19:	191	20,	210	216	222	228	234	240
ο <sub>γ</sub>	Qy Db	ζς O	QY Db	QY DP	Qy Db	QY Db	97 Db	Qy Db	Q Db	Qy Db	0y Db	Qy Dp	Qy Db	Qy Db	Qy Db	Qy Db	oy Dp	Οy

2401 AGCAATAGCAAAGGCTTAACAACAACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGC 2460 2640 2700 2700 2760 2760 2820 2820 2880 2940 2940 3000 3060 3060 3120 3180 2941 AATAACGCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC 3000 3120 3180 3240 3300 3360 3300 3420 3301 GAAATCCAAATTGGGGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTTTTGCGAT 3360 TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA 3480 GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGTTTA 3540 2521 CCAAACGAGAACATGAACAAACCTTTACCAATTGGGTTTTTAGCAATATCACA CCAAACGAGAACATGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 2641 GAGTTAAAAATGAGTGAAATTAATATCTCTAACGCGCCTAATTTTACCTTAAATTCCCAT 2821 AATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCA GAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT GCCACTGGTGGGGCTCTGTTTTTTTGATATATGCCAACCATTCTGGCAGAGGGGCT GTTCGCGGCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCA 2881 AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 1941 AATAACGCCCTAATCAGCAAAACATAAGGATAGGTTATAAAACTTGGCAGCTTGCTC 3001 GITAAIGGGAGTITAAGITITAAGITITAACTGGCGAAAATGCAGATATTAAAGGCAAICTCACTATT 3061 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTT 3061 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTT 3181 ACCAATGATGATGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC 3181 ACCAATGATGATGATTAAACATTACCACGCTAAACGCAAAGCAAAGCATCATC GAAATCCAAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT 3001 GTTAATGGGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT ACCAATAATGGCACTGCCGAAATTAAATATAACACAAGGAGTGGTAAAACTTGGCAATGTT AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGGAGGACTCTAGT 2521 2821 2581 2641 2701 2761 2881 3121 3301 3481 3421 3361 3361 ô q δ Q δ g g qq δ δ οy οp Qγ ΩD Ω Q δy QQ qq ρy Óγ Pp δ qq Óγ q qq δ ò . q òγ q ò Ω ò

```
ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGAAATGGGGTTA 4440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4501 AAATATTCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4561 GAAAAAGTAAAAGATTTATCTGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                                                                                                                                                                                                                                                                                               4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4261 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                          3841 GCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAAGT 3900
                                                                                                                                                                                                                                                                                                         GTTAGCGCCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960
                                                                                                                                                                                                                                                                                                                                                              GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                                                                                                                                                                                                                                                                                                                                                                                    AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCCGCAGAATTAATGCGACA 4080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4140
                                                                                         3601 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAAATGATGACATAAATAGCAAAGTG 3660
                                                                                                                                                                                 3721 ATTACTGCAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAAAGATAATC 3780
                                                                                                                                                                                                           3721 ATTACTGCAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTAAAACAGTAAATATC 3780
                                                                                                                                                                                                                                     3781 ACCGCGTCGGAAAAGGTTACCACCACAGCCTCGACCATTAACGCAACAAATGGCAAA 3840
                                                                                                                                                                                                                                                                3781 ACCGCGTCGGAAAAGGTTACCACCACAGGCTCGACCATTAACGCAACAAATGGCAAA 3840
3481 GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 3540
                          3541 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3600
                                                                             3601 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 3660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC
                                                                                                                              4381
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4381
                                                                                                                                                                                                                                                                                                                                                                          3901
                                                                                                                                                                                                                                                                                                                                                                                                                               3961
                                                                                                                                                                                                                                                                                                                                                                                                                                                         4021
                                                                                                                                                                                                                                                                                                                                                 3901
                                                                                                                                                                                                                                                                                                                                                                                                    3961
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4021
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4081
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      П
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             οy
                                                                                                                                                                                                                                                                                                                                                                    QQ
                                                                                                                                                                                                                                                                                                                                                                                                    δλ
                                                                                                                                                                                                                                                                                                                                                                                                                          Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                      δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Óλ
                                                                                                                                                                                                                                                              QQ
                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                   Dp
                                                                                                                                                                                                                                                                                                                                                δý
                           òγ
                                                     g
                                                                              òγ
                                                                                                       Db
                                                                                                                                ŏ
                                                                                                                                                        С
                                                                                                                                                                                  ò
                                                                                                                                                                                                           g
                                                                                                                                                                                                                                  οy
```

```
0
                                                                                                                                                                                                                                                                                                 linear PAT 13-MAY-1997
                                                                                                                                                                                                                                                                                                                                                                                         1 (bases 1 to 4937)
Barenkamp,S.J.
High molecular weight surface proteins of non-typeable haemophilus Patent: US 5603938-A 3 18-FEB-1997;
Location/Qualifiers
                                                                                                                                                                       ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                               4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGGCCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTTCATCTTT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                100.0%; Score 4937; DB 6; Length 4937; illarity 100.0%; Pred. No. 0; Conservative 0; Mismatches 0; Indels 0;
                                                                                                                                                                                                                                                                                                     DNA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1251 t
                                                                                                                                                                                                                                                                                               4937 bp
Sequence 3 from patent US 5603938.
135771
                                                                                                                                                                                                                                                                                                                                                                                                                                                         /organism="unknown"
948 c 1009 g
                                                                                                                                                                                                                                                                                                                                  I35771.1 GI:2086995 '
                                                                                                                                                                                                                        4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                    4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                 .4937
                                                                                                                                                                                                                                                                                                                                                                                Unclassified.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Query Match
Best Local Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1729 a
                                                                                                                                                                                                                                                                                                                                                          Unknown
                                                                                                                                                                                                                                                                                                                                                                       Unknown
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Matches 4937;
                                                                                                                                                                                                                                                                                                                                                                                                                                                   source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BASE COUNT
                                                                                                                                                                                                                                                                                                               DEFINITION
                                                                                                                                                                                                                                                                                                                                                                       ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                           JOURNAL
                                                                                                                                                                                                                                                                                                                           ACCESSION
VERSION
                                                                                                                                                                                                                                                                                                                                                                                            REFERENCE
                                             4681
                                                                 4681
  4621
                                                                                                                                                                                                                                                                                RESULT 5
                                                                                                                                                                                                                                                                                                                                                  KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                       FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                  TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Ωp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         òγ
                                                                                                                                                       QQ
                                                                                                                                                                              οχ
                                                                                                                                                                                                   Оp
                                                                                                                                                                                                                        οy
                                                                                                                                                                                                                                              g
                                             Óγ
                                                                 qq
                                                                                       Óγ
                                                                                                             qq
                                                                                                                                  δ
```

42 48 48 48 46 60	600 660 660 720 720 780	840 840 900 900 960	02 02 08 08 114	1200 1200 1260 1320 1320 1380 1380 1440
######################################	TAGATGGTAATAAAACCATTATCCGCAACAGTGTAGTACACGGCACAGCCACTATATCACTATATCACACACTATCACTATATCACACACTATCACTACT	GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC [	TGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGT 	GGCGATATITITICCAAAAGGCGGTAACATAATGCCGTGCCG
361 361 421 481 481 541	7 7 9 9 9 9	781 781 841 901	961 961 1021 1021 1081 1081	141 141 201 261 261 321 321 381
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9		

C

1441 GGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAGGCTCAACCATCAATGTATCAGGC 1500 1620 1680 1681 GATGTAACAATTGAAGCCGGAAGACCCCCTTCGCAATAATACCGGTATAAATGATGAATTC 1740 1800 1860 1920 1920 1980 1980 2040 2040 1680 1860 2100 2100 2160 2220 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280 ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 2340 2460 ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 2340 AACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAATACATTTCA 2400 2401 AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 2460 GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAA 2520 CCAAACGAGAACATGAACACAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 2580 1501 AAAGAAAAAGGGGGACGCGTATTGTGTGGGGGGGATATTGCGTTAATTGACGGCAATATT AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1861 AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAAATAGCGAACTCAAAACAACGCTA ACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCATCA 1801 ACCAATACAACTATTTCAAATTATCTGAAAACGCCTGGACAATGAATAAACGGCATCA 1861 AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACCACTTAATTCTCCAT 1921 AGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA 2041 GGTTTTTAAATATACGGCGCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC AATTTAACCATTTATTCTGGCGGATGGTTGATGTTCATAAAAATATTACGCTTGATCAG GACGCGCCAAATGCTCGCCCAGGGCACTGTAACCATTACAGGAGGGAAAA GATTTCAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTTCA 2461 GTAAATGGGAACATGTCATTCAATGTCAAAGAAGGAGGAAAGTTAATTTCAAATTAAAA AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 1441 1621 1741 1561 1621 1801 1981 2101 2101 2161 2161 2221 2281 2281 2401 2221 2341 2341 2461 2521 ŏ qq ò qq Op Qγ ò q δ g δ qq ò qq Óγ qq Qγ QQ qq Ω δ Ω ò qq δ g οy q ò qq δ Pρ δ

0 0 0 0		0 0 0	0:	0:	00	09	20	80	40	00	09	20	90	40	00	9
ا ف ف کا	7 7 7	276 282 282	288 288	294 294	300	306	312	318	32,	33(	33	34	34	35	36	36
	GAGTTAAAATGAGTGAAATTAATATCTCTAACGGGGGGTAATTTTACCTTAAATTCCCAT [	CGCGGCGATGACGCTTTTAAAATCAACAAGACTTAACCATAAATGCAACCAATTC TTCAGCCTCAGACGACGAAGATGATTTTTATGACGGGTACGCACGC	SCGGTAAT           SCGGTAAT	AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 	AATAACGCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC	GTTAATGGGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT	TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTT 	ACCAATAATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGCAATGTT 	ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC	GGCGGAGATATAATCAACAAAAAGGAAGCTTAAATATACAGACAG	GAAATCCAAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT 	AAAATTAATATCACCAAACAGATAACAATCAAAAGGGTATTGATGGAGGGGCTCTAGT 	TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA 	GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 	ACTATTGGCAACAGTAATGACGGTAACAGGGTGCCGAAGCCAAAACAGTAACTTTTAAC 	AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG
5 5 5 5 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6	2641 2641 2701	2701 2761 2761	2821 2821	2881	2941	3001 3001	3061 3061	3121	3181 3181	3241	3301 3301	3361 3361	3421 3421	3481	3541 3541	3601
Db Qy Db	Qy Db	pp OX Dp	Qy	Qy	QY	Qy	Qy	Oy Db	Qy	Oy Db	Qy	ζζ	QY Db	Qy Db	Qy	δλ

ATGETTAAGGATECGAAAGGGTGAAAGGATAGGGAAAGGAAA	AATGTT	그는 병교의 방교의 양교의 양교의 양교의 양교의 양교의 장교의 장교의 학교에 한국이 한국이 변수된 생각의 원교회
--	--------	--

```
PAT 31-JAN-2002
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ó;
                                                                                                                                                                                                                          High molrcular weight surface protein of non-typeable haemophils. BD010356.1 GI:18638729
JP 2001503602-A/2.
                                                                                                                                                                                                                                                                                                                             High molircular weight surface protein of non-typeable haemophils Patent: JP 2001503602-A 2 21-MAR-2001; SENTLOUIS UNIV, WASHINGTON UNIV
4801 GTAGATITCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                         GITCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                      61 CACCITITITGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATTCCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               CACATGAAATGATGAACCGAGGGAAGGGAGGGGGGGAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              DB 6; Length 4937;
                                                                                                                                                                                                                     linear
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1; Indels
                                                                                                                                                                                                                                                                                                                                                                                                                       STEPHEN J BARENKAMP
C07H21/02, C07H21/04, C12P21/06, A61K39/102
                                                                                                                                                                                                                                                                                                                                                                                                                                                          Location/Qualifiers
                                                                                                                                                                                                                     DNA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1251 t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     100.0%; Score 4935.4; 100.0%; Pred. No. 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            0; Mismatches
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /organism="unidentified"
/db_xref="taxon:32644"
                                                                                                                                                                                                                                                                                                                                                                                                             08/617697
                                                                                                                                                                                                                   4937 bp
                                                                                                                                                                                                                                                                                                                                                                                                01-APR-1997 JP 1997535346
01-APR-1996 US 08/61769
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   source 1. .4937
/organism='Haemophils'.
Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1009 g
                                                                                                                                                                                                                                                                                                                                                               Haemophils
JP 2001503602-A/2
21-MAR-2001
                                                                                                                                              4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                          1 (bases 1 to 4937)
Barenkamp, S.J.
                                                                                                                                     4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     949 c
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Matches 4936; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    .4937
                                                                                                                                                                                                                                                                       unidentified.
                                                                                                                                                                                                                                                                                   unidentified unclassified.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1728 a
                                                                                                                                                                                                                  BD010356
                                                                                                                                                                                                                                                                                                                                                                Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Best Local
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     source
                                                                                                                                                                                                                            DEFINITION
                                                                                         4861
                                                                                                                                                                                                                                     ACCESSION
VERSION
                                                                                                                                                                                                                                                                                   ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  BASE COUNT
ORIGIN
                                                                                                                                                                                                                                                                                                                               TITLE
JOURNAL
                                                                                                                                                                                                                                                                                                                    AUTHORS
                                                                                                                                                                                           RESULT 6
BD010356
                                                                                                                                                                                                                                                           KEYWORDS
SOURCE
                                                                                                                                                                                                                                                                                                          REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        121
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        FEATURES
                                                                                                                                                                                                                                                                                                                                                               COMMENT
                                                                                                                                                                                                                  COCUS
 á
                                                                 q
                                                                                                             g
                      셤
                                             ŏ
                                                                                         à
                                                                                                                                   ò
                                                                                                                                                         a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ó
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
```

```
1021 ATTAGGGTAAATGGTGGCAGCATTTCTTACTCGCAGGGCAAAAAATCACCATCAGGGAT 1080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGGGGTCAATCTG 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GAACGCAAATGATAAAGTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                   361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                                   ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG 1020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACCATCAGCGAT 1080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1201 GGTAAACTITCTGCTGATTCTGTAAGCAAAAAAAGGGGCAATATTGTTCTTTCCGCC 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 AAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGGCAAGAATGAAGAGGGGAGCTGAAC 300
                                                                                                                    CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                 GGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA 1200
                                                                                                                                                                        540
                                                                                                                                                                                               540
                                                                                                                                                                                                                  541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600
                                                                                                                                                                                                                                             009
                                                                                                                                                                                                                                                                      99
                                                                                                                                                                                                                                                                                           099
                                                                                                                                                                                                                                                                                                                   720
                                                                                                                                                                                                                                                                                                                            780
                                                                                                                                                                                                                                                                                                                                                                                                               840
                                                                                                                                                                                                                                                                                                                                                                                                                                      840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     900
                                                                                                                                                                   481 CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA
                                                                                                                                                                                 721 GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC
                                                                                                                                                                                                                                                                                                                                                                                                                       601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA
                                                                                                                                                                                                                                                                                                                                                                                                          781 GGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGGCGCAATTATTAAC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       661 CAATTTAACATGGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC
                                                                                                                                                                                                                                                                                                                                                                                    721 GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         TTCACCTTCGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGTTTAATT
                                                                                                                                                                                                                                                                                                                                                                                                                                                           841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT
                      301
                                                                                             361
                                                                                                                    421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         901
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        961
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1021
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1081
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1141
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1201
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1261
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1321
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1321
                                             Dp
                     δ
                                                                      ŏ
                                                                                            qq
                                                                                                                    δ
                                                                                                                                           g
                                                                                                                                                                                        q
                                                                                                                                                                  ò
                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                       a
                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                      P
                                                                                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                                                                                                    Ω
                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                 pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                P
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Dρ
```

1440 1440 1500 1500 1560 1560	62 68 68 74 74 80	1860 1860 1920 1920 1980	04 04 10 10 16	2220 2220 2280 2280 2340 2340 2400 2460
	ACCCTCAAGGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGGGGCATTATTATCCTTTAATCTTTGATGAAAACGGGTTGTTGTGGGGGCGATTATATCCTTAAAACCGGTGGTTGTTGTGGGGGCGTTTTATCCTTTGACGGGGGGATTGTTAAAAAAAA	CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAAATAGCGAACTCAAAACATCGCT ACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCTCAAACAACGCTGAAAACAACTGTTTTTTTT	AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATTTACGCTTGATCAATTAACCATTTATTCTGGCGGATGGGTTGATGATTCATAAAAAATTTACGCTTGATCAATAACGCTTGATCAATTAACGCTTTGATCAATTAACGCTTTGATCAATTAACGCTTTGATCAAGGTTTGATCAATTAACGCTTTGATCAAGGTTTTTAAAAAATAATAACGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAAGCACGGTTTTTTTAAAAAATAACGCCCCTTCCGTAGCTTTTTTAAGGTGGAAATAACAAAAAATGTCGCCCCAGGGCAACGTGAAAAATAACAAAAATGTCGCCCCAGGGCCACTTTTAAAAAATAACAAAAAATGTCGCCCCAGGGCAACAAAAAAATGTCGCCCCAGGGCAACAAAAAAAA	GATTTCAGGGCTAACAACATTTTTAAACGGAACGGGTAAAGGTTGAATTTTCATTTCATTTCATTTTCATTTTCATTTTCATTTTTT
1381 1381 1441 1441 1501 1501	7 6 6 6 5	1741 1801 1801 1861 1861 1921	66661	2161 2221 2221 2221 2281 2281 2341 2401
		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 y 0 y 0 y 0 y	

5 2 2 2	64	27 27 27 28 28	0 0 0 0	m m	30	m m	m m	<b>6</b> 6	m m	m m	T 3420 1 T 3420	34	A 3540     3540	C 3600
AATTAAA AATTAAA AATTAAA ATTCAC	AGAGGGGC AGAGGGGC AGAGGGGC	ACCAATTC ACCAATTC ACCAATTC AATGCCAT	CAAAACTCA 	AGETTGCTC             AGCTTGCTC	CTCACTATS 	GGCAATTT 	GGCAATGT          GGCAATGT	AGCATCATO IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	AATGATGCT	TCTTCCGA'             TCTTCCGA'	GACTCTAG	TTGACAGE 	AGAGATTT	AACTTTAAC
	ATTCTGGC. ATTCTGGC. TTACCTTA.	AAATCAAAGAAGGATTAACCATAAATGCAACCAATTCA 2 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	NATGTCACCCTTGGTGGACA 	AACTTGGC            AACTTGGC	AAGGCAAT              AAGGCAAT	ATATCACC               ATATCACC	TAAAACTI	ACCAAAGA 	ACAGTAAT	TCACGATT	ATGGAGAG 	BAATTGAAA 	AAAGATGG1            \AAGATGG1	AAAACAGTA
AGCGAAAG 	TGCCAACC TITITI TGCCAACC CGCTAATT	CTTAACCA CTTAACCA CTTAACCA TGACGGT	TGTCACCC           TGTCACCC AGCAGCAAAGCAGCAAAAGCAGCAAAA	AGTTATAA 	AGATATTA 	TACCCTAP 	AGGAGTGC 	TAAACGCA 	TATTACAC 	AGGCAACO	NGGGTATT(             NGGGTATT(	AAACCAAA(            AAACCAAA(	FTACAGCC/	CCGAAGCC
CTCAAAGAAGGAGCGAAAG' LIIIIIIIIII CTCAAAGAAGGAGCGAAAG' AAACCTTAACAATTCGGT	SATATATA SATATATA SCTATATA TCTAACGG	AACAAAGA AACAAAGA AACAAAGA GATTTTA GATTTTA	GGCGGTAA           GGCGGTAA ATCGAGAA ATCGAGAAA	AGGGATAG           AGGGATAG	GAAAATGC            GAAAATGC	ACTAGAGA 	ATAACACA 	ACTCACGC	AGCTTAAA 	CAAAAAG? 	ATCAAAAA	ACTATTA!                ACTATTA!	AGCAGAGAT                   AGCAGAGAT	AACAGCGGTG
TCAATCTC          TCAATCTC CAAGCAAA	CTGTTTTTTGA	TTAAAATC TTAAAATC TTAAAATC CGAAAGAT	CCATTCTG	AAAACATA 	TAACTGGC	aaggaaág                aaggaaag	AAATTAAT           AAATTAAT	ACATTACC	AAAAAGGA              AAAAAAGGA	ATATCTCC	AGATAACE 	SCCAACCT	FTCAATAAA            FTCAATAAA	GACGGTAA
CAACATGTCATT	GGGCTCTG 	TGACGCTT TGACGCTT TGACGCTT CAGACAGA	CAACATAT 	TAATCAGO              TAATCAGO	TTTAAGTT             TTTAAGTT	CACTTTTA	CACTGCCG	TGATTTAP 	AATCAACP	TEGEGGER TITITITI	CACCAAAC 	CAAGTAATC	PTTCAGGTT 	AACAGTAAT(
GTAAATGGCAA 	ACTGGG ACTGGG TTAAAA	CGCGGCGA 	11 AATTCAACCTACAACATATCCATTCTGGGGGGTAATGTCACCCTTGGTGGACAAAACTCA 11111111111111111111111111111	AACGCCC	PATGGGAG 	AGAAAGCGC                     AGAAAGCGC	CAATAATGC	CAATGATGC	GGAGATA1 	AATCCAAA:	AATTAATA:           AATTAATA:	AGATGCGA(           AGATGCGA(	CCTAAGTA'               CCTAAGTA'	TATTGGCA
GTA GTA GTA CCA	25 GA	GTTCC GTTCC GTTCC AATTT	AAT AAT AGC	AAT - I - I	GTJ	10 TC	ACC	AC - AC	55 – 55	1 GA	1 AA - 1	1 1 1 1 1	1 GA	1 AC
2461 2461 2521 2521	0 2 2	2701 2701 2701 2761 2761		ი ი	0 0	3061	3121	3181	(N (N	3301	3361	3421	348]	3543
oy oy	Oy Db	o o o	oy oy	Qy Db	Qy Db	Oy Db	QY	Qy Db	QY Db	Qy Db	QY	Q Dp	Oy Db	Οy

3600 3660 3720 3720 3780	3840 3840 3900 3960 3960 4020	4020 4080 4080 4140	4200 4200 4260 4260 4320	4380 4380 4440 4500	56 56 68 68 68 68 68 68 68 68 68 68 68 68 68
	1 ACCGGTCGGAAAAGGTTACCACCACAGGCTCGACCATTAACGCAACAATGGCAA	GAGGCTAATGTTATTTTTTTTTTTTTTTTTTTTTTTTTT	1 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 1 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 1 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCACGTGGCAGGCA	GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGGTGTGTTGTTGTTGTTGTTGTTGTTGTTGTTG	AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAACGCGTCCT
54 60 66 66 72	378: 378: 384: 390: 390: 396:	96 02 02 08 08	4141 4141 4201 4201 4261	4321 4321 4381 4381 4441	4501 4501 4561 4561
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	Oy Oy Oy	oy Oy Oy	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	oy oy

```
linear BCT 05-AUG-1994
                                                                                                                                                                                                                                                                                                                                                                               HIU08875

8983 bp DNA linear BCT 05-AUG-1994
Haemophilus influenzae strain 12 adhesin (hmw2A) gene and putative
accessory processing proteins (hmw2B) and (hmw2C) genes, complete
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1 (bases 1 to 4937)
Barenkamp, S.J. and Leininger, E.
Cloning, expression, and DNA sequence analysis of genes encoding nontypeable Haemophilus influenzae high-molecular-weight surface-exposed proteins related to filamentous hemagglutinin of Bordetella pertussis
                               4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                         4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                          GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  /clone_lib="Lambda EMBL3 genomic library of strain 12" 130. 241 /citation=[1]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Haemophilus influenzae
Bacteria; Proteobacteria; gamma subdivision; Pasteurellaceae;
Haemophilus.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2 (bases 4938 to 8983)
Barenkamp, S.J. and St Geme, J.W. III.
Genes encoding high-molecular-weight adhesion proteins of nontypeable Haemophilus influenzae are part of gene clusters Infect. Immun. 62 (8), 3320-3328 (1994)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Infect. Immun. 60 (4), 1302-1313 (1992) 92192797
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /db_xref="taxon:727"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /rpt_type=TANDEM
/rpt_type=DIRECT
352. .4785
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /gene≂"hmw2A"
352. .4785
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /strain="12"
                                                                                                                                                                                                                                                                         4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                         3 (bases 1 to 8983)
Barenkamp, S.J.
                                                                                                                                                                                                                                                                                                                                                                                                                                     U08875 M84615
U08875.1 GI:482840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1548058
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    repeat_region
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  SOURCE
                                                                                                                                                                                                                                                                                                                                                                              LOCUS
                                                                                                                                                      4801
                                                                                                                                                                                                                                                                                                                                                                                                                                        ACCESSION
VERSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            REFERENCE
AUTHORS
TITLE
                                                                                                                                                                                                                                                                                                       4921
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PUBMED
REFERENCE
AUTHORS
TITLE
JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    JOURNAL
MEDLINE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  PUBMED
REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                AUTHORS
TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       MEDLINE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               gene
                                                                                                                                                                                                                                                                                                                                                                HIU08875
                                                                                                                                                                                                                                                                                                                                                 RESULT 7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             COMMENT
                                 δŏ
                                                             qq
                                                                                                                       qq
                                                                                                                                                                                 Dp
                                                                                                                                                      δ
                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                               ŏ
                                                                                                                                                                                                                                                                         ŏ
```

```
/ CAD X-TELE - VALI : A & LA & L.

/ CLEANS LA LION = "MUKITY RIKF SKRINALVAVSELARGCDHSTEKGSEKPARMKVRH
/ LALK PLSAMILLSLGYTS I POSVLAGGLOGNDVHGTATMOVDGKRIT I IRNSOPAL I INW
KOPTIANTONE MOVE OLDENNINSAN FROM STORE ACCOLLOSNOGO FILLINPRICITY TO READ MAND STORE I INVESTIGATIONE MOVESTALLINPRICITY OF ACCOLLOSNOGO FILLINPRICITY OF ACCOLLOS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          IAKKOYEFACKELMVILEKMÄNNFGGVHDIEFDAPAOLAYLPEKLLIYFATRLANAIT
TLFSDPELA ISEGGALKMISLORWITLIFASSPYVANDHILMKYNINPDSEGGFHLAT
DIONS.IAKET CIPYLDESNVINNSLDALMAGNOOLCASLCFALOSSRFIGTASARHATVA
LOWFPKKLAFTANDELPANIIHDVYMHCSYDLAKNRHDVKRPLNELYRKHILTOGWO
DRYLYTLGKKDGKPVMWYLLEHFNSGHSIYRHSTSNIAARRKTVLVGLGHBGVDKIG
VALGHPATHGBEIDSNNIMRELFTRKOCETFQPAVFYMPSIGMDITTIFVSNTRLAPIOA
RACHGHPATHGBEIDDVIVVEDDYVGSEDCFSSTLLRLEKDALFYVDSALAPOKYDYVL
RENPEVVNIGIAATTMKLNPEFLLTLQEIRDKAKVKIHFHFALGGSTGLTHPYVKWFI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /translation="MTKENLQNAPQDATALLAELSNNQTPLRIFKQPRKPSLLRLEQH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        NELSMEKTTRFOISPTAFYDAGOFRYNSENAKTYGEDMHTVSSAGLGIKTSPTONLSL
DAFVARRFANANSDNLNGNKKRTSSPTTFWGRLTFSF"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                6809. .8761.
/gene="hmw2C"
/note="putative accessory processing protein"
/citation=[2]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /note="putative accessory processing protein"
/note="surface-associated protein"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                /protein_id="AAA20526.1"
/db_xref="G1:482843"
                                                                                                                                                                                                 /protein_id="AAA20524.1"
/db_xref="GI:482841"
                                                                                                                                                            /product="adhesin"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /codon_start=1
/transl_table=11
                                                                                                                            /transl_table=11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /gene="hmw2C"
6809. PTC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /codon_start=1
                                                                                  /codon_start=1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /gene="hmw2B"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /gene="hmw2B"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /citation=[2]
```

gene

CDS

gene

CDS

```
ESYLGDDATAHPHAPYHDYLAILRDCDMLLNPFPFGNTNGIIDMYTLGLVGVCKTGDE VEHIDEGLEKRLGLFPWLIADTRETYIECALRLAENHQERLELRRYIIENNGLQKLF TGDPRPLGKILLLKRYSHWKRNDLSKR"
176PRPLGKILLLKRYSHWKRNDLSKR"
1773 9 2400 t
                                                                                           ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    781 GGACAAGTCTTTTTAAŢCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       TICACCTICGAGCAAACCAAAGAIAAAGCGCTCGCTGAAATIGIGAATCACGGITIAAIT 960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        661 CAATITAACATCGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              721 GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACTACACGCCACAGTCTATG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                                                                                                           421 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  421 CGGGGTTGTGACCATTCCACAGAAAAGGCAGCGAAAAAACCTGCTCGCATGAAAGTGCGT 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                            121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTTCAT 180
                                                                                                                                                                                                                        241 CACATGAAATGATGAACCGAGGGAAGGGAGGGGGGCCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                 61 CACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCCGCCATATAA 120
                                                                                                                0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          99.3%; Score 4900.2; DB 1; Length 8983; 99.5%; Pred. No. 0;
                                                                               Pred. No. 0;
0; Mismatches 23; Indels
                                                                                   Sest Local Similarity 99.5
Matches 4914; Conservative
                                        3024 a
                                                                           Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           106
                                       BASE COUNT
ORIGIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ÓΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Óγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           οy
                                                                                                                                                                                                                                                                                                                                                                             Dρ
                                                                                                                                                                                                                                                                                                                                                                                                                        QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                               Ωý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Db
                                                                                                                                                                                                                                                                                     Ωp
                                                                                                                                                                                                                                                                                                                                 Db
                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                    Ω
                                                                                                                                                                     Óλ
                                                                                                                                                                                          Op
                                                                                                                                                                                                                   ŏ
                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                               óλ
                                                                                                                                                                                                                                                                                                            δy
```

50			00	0 0		0 0	0 0				0 0		0 0	0 0				
0 10.	01	11	11	120	12	132			<u> </u>	ີດີດີ	162	68	74	1800	86		1980	04
61 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGTGT 	21 ATTAGGGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAATCACCATCAGGGCA 	ACCCAACCATACTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATC	1 GGGGATATTTTTGCCAAAGGCGGTAACATTAATGTCCGTCGTCGTCGAATCTTCTAATGTTTTTTTT	- OCCONTITITIOCCHANGECUGIAAUTTATIGTCCGTGCTGCGCACTATTCGAAACC GTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTCCG		61 AAAGAGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAGCTAAAGGC 	GGCAAGCTGATGATACAGGCGATAAAGTCACATTAAAAAACAGGTGCAGTTATCGACCTT 	1 TCAGGTAAAGAAGGGGAAACTTACCTTGGGGGTGACGAGGCGGGGGAGGTAAAAC 	1 GGCATTCAATTAGCAAAGAAACCTCTTTAGAAAAGGCTCAACCATCATGTATCAGG 	1 AAAGAAAAGGGGGGGGGGTATTGTGTGGGGGGATATTGGGTTAATTGAGGGGAATAT 	1 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT	CAAAAGAGTGGTTGCTAGACCCTG	GGTATAAATGATGAA 	1 CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAATAGCGAACTCAAAACAACGCTA 	TTATCTGAAAAACGCCTGGACAATGAATATAACGCATC 	AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTC 	. AGTAAAGGTCAGCGTGGCGGAGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA 	AATTTAACCATTTATTCTGGCGGATGGCTTGATGTTCATAAAATATTACGCTTGATCA 
ன் க	100	106		120	120	126	132	138	144 144	150	156	162	1683	174]	1801 1801	1861 1861	1921 1921	1981 1981
Qy	Qy Db	Qy	δ d	0y	qq	Oy Dp	Oy Dp	Qy Db	Qy Dp	Qy	OY Db	Qy Dp	Qy Db	Qy Db	Qy Dp	Oy Db	Qy Dp	Qy

```
4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4141 ATCACTTCAACTTAAGGGTCAGGTAGACTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                                                                                                                                                                                     3541 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3600
                                                                                                                                                                                                                                                                                                                                                                                         3541 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3600
                                                                                                                                                                                                                                                                                                                                                                                                                 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 3660
                                                                                                                                                                                                                                                                                                                                                                                                                                   AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       3721 ATTACTGCAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC 3780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     3721 ATTACTGCAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAAACAGTAAATATC 3780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              3781 ACCGCGTCGGAAAAGGTTACCACCACAGGCTCGACCATTAACGCAACAAATGGCAAA 3840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                3841 GCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAAGT 3900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 3901 GITAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAATTGAAGCGAAATCGGGT 3960
                                                                                                                                                                                                                                                                                                          3481 GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGTTACAGCCAAAGATGGTAGAGATTTA 3540
3181 ACCAATGATGATGTTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC 3240
                                                                                           GAAATCCAAATTGGCGGCAATATCTCGCAAAAGAAGGCAACCTCACGATTTCTTCCGAT 3360
                                                                                                                                                                                                   3361 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGAGGACTCTAGT 3420
                                                                                                                                                                                                                                                                                                                                                                                                                    3601
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         3661
                                                                                                                                                                           3301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             οq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Op
                                                                                                                                                                                                                                                                                                                                                                                     QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Dβ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Dβ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                QΥ
                                                                                                                                               Qγ
                                                                                                                                                                       qq
                                                                                                                                                                                                  δy
                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                                                              οp
                                                                                                                                                                                                                                                                                                       δŷ
                                                                                                                                                                                                                                                                                                                                 οp
                                                                                                                                                                                                                                                                                                                                                          οy
                                                                                                                                                                                                                                                                                                                                                                                                                  Óγ
                                         ò
                                                                    рp
                                                                                             ŏ
                                                                                                                    g
```

```
linear PAT 29-SEP-1999
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Tobaccas 1 to 9323)

Barenkamp, S.J. and St. Geme, J. William. III.

High molecular weight surface proteins of non-typeable haemophilus
Patent: US 5869065-A 6 09-FEB-1999;
Location/Qualifiers
1. 9323
                                                                                                                                                                                                                                                                                                                         4861 GITCAGIACGGCTITACCCAICITGIAAAAATTACGGAGAATACAATAAAGTATTIT 4920
                                                                                                        4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500
                                                                                                                                                                                                                      4621 GCTGTACGTTTTGTTGAGCCAAATAACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                   4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4801 GTAGATITCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4861 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                          4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                               4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440
4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                           4261 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Score 4820.2; DB 6; Length 9323;
Pred. No. 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          DNA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 9323 bp
Sequence 6 from patent US 5869065.
AR032350.1 GI:5947955
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /organism="unknown"
1829 c 1832 q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             97.6%;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Unclassified.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Query Match
Best Local Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  3134 a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Unknown.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              RESULT 8
AR032350
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        VERSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  SOURCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δy
                                                                                                                                                                                                                                                                                                                                                          Q
                                                                                                                                                                                                                                                                                                                                                                                       Ω
                                                                                                                                                                                                                                                                                                                                                                                                                  q
                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                              g
                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                       Db
                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                δλ
                                                                                          ò
                                                                                                                      Db
                                                                                                                                                   δý
```

Mar

Tue

ö CAATCTGTTTTAGCAAGCGGCAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTAC 1040 1160 1340 1400 1460 420 ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACCATCAGCGAT 1080 CACCTITITIGCAGICTATATGCAAATATTTTAAAAAAATAGTATAAATTCGGCCATATAA 120 620 240 680 300 360 860 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480 540 780 Gaps CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600 840 **AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT** CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA CTITCATCTITCATCTITCATCTTICATCTTICATCTTICATCTTTCATCTTT CACATGAAATGATGAACCGAGGGAAGGGAGGGGCCAAGAATGAAGAGGGGGTGAAC ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC TTCACCTTCGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGTTTAAATT ACTGTCGGTAAAGACGCCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTC ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT ACTGTCGGTAAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG ö 73; Indels Mismatches . 0 Conservative Matches 4864; 61 501 121 561 241 1041 181 621 361 1101 1341 681 301 741 801 861 921 541 981 601 721 1161 1221 1281 1401 421 481 661 781 1021 841 901 961 1461 à g δ Сp ò Op ô QQ á qq ò g ò q qq ò ŏ q ò g Op g ò ογ ò a ò Dp à g ö g ò g ò qq

1760 1380 1260 2180 1800 2160 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATCTG GGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC AAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1761 GGCAAGCTGATGATAAAGTCCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1821 TCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACGAGCGCGGGGAAGGTAAAAAC GGCATTCAATTAGCAAAGAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC 2001 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT GGCATITCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC AAAGAAAAAGGCGGACGCGTATTGTGTGGGGCGATATTGCGTTAATTGACGGCAATATT AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTTGTGGAGACATCGGGGCAT GATGTAACAATTGAAGCCGGAAGACCCCCTTCGCAATAATACCGGTATAAATGATGAATTC CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAAATAGCGAACTCAAAACAACGCTA AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT GGTTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC GGTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC **AGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAAGGCGGA** AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 1081 1141 1641 1261 1381 1441 1941 1201 1701 1321 1881 1501 1561 1681 1621 2061 2121 1741 2181 1801 2241 1861 2301 1921 1981 2361 2421 2041 2481 qq à qq ŏ g òγ g ŏ qq g δy δ g δ g g Db δ ò ò q δ QQ g δy ŏ g δ q g δý 9 g à q

0 0	7 7	2 2	0 0	2460	0 0	2580 3020	C1 m		3200	3260	A 2880     A 3320	c 2940   c 3380	c 3000     3440	T 3060   T 3500	3120	3180	c 3240   c 3680	330
1 GATTTCAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCAT 	1 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAAT 	1 ATTAACCAAACTAGGAGAAAGAACACCTGGTATTGGCAAACCAGCCATGAT 	1 AACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAA 	1 AGCAATAGCAAAGGGTTAACAACACAGTATAGAAGGTCTGGAGGGGTGAAT 	1 GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGGGAAAGTTAATTTC 	1 CCAAACGAGAACATGAACAAGCAAACCTTTACCAATTCGGTTTTAGCC 	1 GCCACTGGTGGGGGCTCTGTTTTTTTTGATATATATGCCACCATCTGG	1 GAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTT 	1 GTTCGCGCGGTGACGCTTTTAAAATCAACAAGACTTAACCATAAA	1 AATTICAGCCTCAGACGAAGAGGATGATTTTATGACGGGTACGCOO 	1 AATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGG	1 AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCA 	1 AATAACGCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCT	GTTAATGGGAGTTTAAGTTTAACTGGCGAAAATGCAGATATAAAGGCAATCTCACTAT	1 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCG 	1 ACCAATAATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACT 	1 ACCAATGATGGTGATTTAAACATTACCACTCAGGCTAAAGGCAA	1 GGCGGAGATATAATCAACAAAAAGGAAGCTTAAATATTACAGACAG
216	0 9	228	234	240	246	252	0 2	308	31	32	a 2	33	33	300	30	31	m m	32
Qy Db	Qy Db	Qy Db	oy Db	Qy Dp	QY Db	QY Db	Qy Db	OY Db	QY Db	QY Db	Qý Db	Qy Db	Qy Db	Qy Db	Oy Db	Oy Db	OY Db	ΟŅ

3681 33301 33741 33741 33741 33741 33741 33741 33761 3	
---	--

Db 4761	GATGCATCAGGTGATAGTACACAAAGTGAATGCAGTCAACGACTGGGGGATTTGGTAGTGTG 482
4	ACIOCOCOARCICARGCAGIGIGARIAICACTIGGGGATTTAAACACAGIRAATGGGTTA 4440 
Qy 4441 Db 4881	. AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500 
Oy 4501 Db 4941	. AAATATATCCAGCCAGGTGTAGCAAGTGAAGTAATTGAAGCGAAACGCGTCCTT 4560 
Oy 4561 Db 5001	GAAAAAGTAAAAGATTTATCTGATGAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620 
Oy 4621 Db 5061	GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680 
Oy 4681 Db 5121	ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTGATTCTCTCAAGTGGTAAT 4740
Qy 4741 Db 5181	GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACGCGTAGTCAGTAATTGACAAG 4800
Qy 4801 Db 5241	GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860 
Qy 4861 Db 5301	GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920 
Qy 4921 Db 5361	
AROB3957 LOCUS LOCUS DEFINITION ACCESSION VERSION KEYWORDS SOURCE ORGANISM	AR083957 N Sequence 6 from patent US 5977336. DNA linear PAT 01-SEP-2000 AR083957 AR083957.1 GI:10010728 Unknown. M Unklown.
REFERENCE AUTHORS TITLE JOURNAL FEATURES	1 (bases Barenkamp High mole Patent: U
BASE COUNT ORIGIN	T 3134 a 1829 c 1832 g 2528 t
Query Ma Best Loc Matches	y Match Local Similarity 98.5%; Pred. No. 0; nes 4864; Conservative 0; Mismatches 73; Indels 0; Gaps 0;
Qy 1 Db 441	TAAATATACAAGATAATAAAATAAATCAAGATTTTTGTGATGACAAACAA
0у 61	

```
1040
                                                                                                                                                                                                                                                                                                   1100
                                                                                                                                                                                                                                                                                                                                    1160
                                                                                                                                                                                                                                                                                                                                                                   1220
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1400
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               180
                                  620
  560
                                                                 680
                                                                                  300
                                                                                                                                                                                                                                                                                    099
                                                                                                                                                                                                                                                                                                                                                    780
                                                                                                 740
                                                                                                                 360
                                                                                                                                 800
                                                                                                                                                  420
                                                                                                                                                                   860
                                                                                                                                                                                  480
                                                                                                                                                                                                   920
                                                                                                                                                                                                                   540
                                                                                                                                                                                                                                  980
                                                                                                                                                                                                                                                   900
                                                                                                                                                                                                                                                                                                                   720
                                                                                                                                                                                                                                                                                                                                                                                    840
                                                                                                                                                                                                                                                                                                                                                                                                                     900
                                                                                                                                                                                                                                                                                                                                                                                                                                                      960
CACCITITITICCAGICIAIAIGCAAAIAITITAAAAAAAAAGIATAAAAICGGCCATATAA
                AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCAT
                        CACATGAAATGAACCGAGGGAAGGGAGGGAGGGCAAGAATGAAGAGGGAGCTGAAC
                                                                                        GAACGCAAATGAAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG
                                                                                                                          ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA
                                                                                                                                                         CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATGTTAGGTGTAAC
                                                                                                                                                                                                                          CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG
                                                                                                                                                                                                                                                                 CAATCTGTTTTAGCAAGCGGCAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTAC
                                                                                                                                                                                                                                                                                            CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA
                                                                                                                                                                                                                                                                                 601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA
                                                                                                                                                                                                                                                                                                                  CAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC
                                                                                                                                                                                                                                                                                                                                                                                                                    ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACCATCAGCGAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATCTG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GGCGATATTTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA
501
                                561
                                                               621
                                                                                                681
                                                                                                               301
                                                                                                                               741
                                                                                                                                                361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1021
               121
                                                181
                                                                                                                                                                801
                                                                                                                                                                                                                                                                                                                                                                   1161
                                                                                241
                                                                                                                                                                                 421
                                                                                                                                                                                                                                                                  981
                                                                                                                                                                                                                                                                                                                  661
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1401
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1461
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1081
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1521
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1141
                                                                                                                                                                                                                  481
                                                                                                                                                                                                                                                  541
                                                                                                                                                                                                                                                                                                                                                  721
                                                                                                                                                                                                                                                                                                                                                                                   781
                                                                                                                                                                                                                                                                                                                                                                                                    1221
                                                                                                                                                                                                                                                                                                                                                                                                                    841
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      961
               ŏ
                               ρp
                                               ά
                                                             q
                                                                                ò
                                                                                              qq
                                                                                                              οy
                                                                                                                              Db
                                                                                                                                                ōλ
                                                                                                                                                               g
                                                                                                                                                                                 δ
                                                                                                                                                                                                g
                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                               QQ
                                                                                                                                                                                                                                                 óλ
                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                  δλ
                                                                                                                                                                                                                                                                                                                                οg
                                                                                                                                                                                                                                                                                                                                                Qγ
                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                 Db
                                                                                                                                                                                                                                                                                                                                                                                                                                   QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ΩD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                   δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Qy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δλ
```

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		GAGGGIGARACGGGGATACAGGGGGATAAAATCAGGTGGGGGGGGGG	AGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACGAGCGCGGCGGAGGTAAAAAC 1441 	CATTCAATTAGCAAAGAAAACCTCTTTAGAAAAGGCTCAACCATCAATGTATCAGGC 1500 	araaaggggacgcgctattgtgtggggcgatattgcgttaattggggggatatt 156( 	CTCAAGGTAGTGGTGAT 	TTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680 	STAACAATTGAAGCC 	DAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAATAGCGAACTCAAAACAACGCTA 1800 	CAP	AAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT 1920 	GTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA 1980 	ATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAATATTACGCTTGATCAG 2040 	GTTTTTAAATA 	argegegeaaatgetaaaattgtegeecagggeactgtaaccattaeaggagaaaa 2160 	SATTTCAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTTCA 2220 	TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280 
	GTAAAG         GTAAAG 	GCAAG GCAAG GCAAG	CAGGT         CAGGT	GCAT GCAT GCAT	AAAGAA        AAAGAA	AACGCT           AACGCT	ATTT 	GATGT        GATGT	CCAAC	ACCAP        ACCAP	A - A	AGT  -  AGT	1 AATT 	1 GGTT 	1 GACG 	1 GATT 	1 TCAG           TCAG
	oy oy	oy Db	QY Db	Qy	QY	Qy Dp	ογ	P 64	Qy Dp	Qy	QQ	Qy Db	Qy	QY Db	Qy Db	do Oy	QQ Dp

```
3301 GAAATCCAAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT 3360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      3361 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGGAGGACTCTAGT 3420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            3121 ACCAATAATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAAACTTGGCAATGTT 3180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             3181 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC 3240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         3001 GITAATGGGAGTITAAGTITAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT 3060
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      3061 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTT 3120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           2941 AATAACGCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAAACTTGGCAGCTTGCTC 3000
                                                                                                                                                                                                                                                                                                                       2821 AATTCAACCTACAACATATCCATTCTGGGGGGTAATGTCACCCTTGGTGGACAAAACTCA 2880
                                                                                                                                                                                                                                                                                                                                                                                                                                        3261 ANITCAACCIACAACAIAICCAIICIGGGGGGTAAIGICACCTIGGIGGACAAAACICA 3320
                                                                                                                                                                                                                                                                                                                                                                                                                                                              2881 AGCAGCAGCATTACGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 2940
                                                                                                                                                                                                                              2581 GCCACTGGTGGGGGCTCTGTTTTTTGATATATGCCAACCATTCTGGCAGAGGGCT 2640
3021 GCCACTGGTGGGGGGCTCTGTTTTTTGATATATGCCAACCATTCTGGCAGAGGGCT 3080
                                                                                                                                                                                                                                                                            2641 GAGTTAAAAATGAGTGAAATTAATGTCTAAGGGGGCTAATTTACCTTAAATTCCCAT 2700
                                                                                                                                                                                                                                                                                                   3081 GAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT 3140
                                                                                                                                                                                                                                                                                                                                                                     2521 CCAAACGAGAACATGAACAAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 2580
                                                                                                                                                                                               2341 AACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAATACATTCA 2400
                                                          2781 AACGTCAGTGCTCTTAATCTAGAGACAGGGGCAAATTTACCTTTATTAAATACATTCA 2840
                                                                                         2401 AGCAATAGCAAAGGCTTAACAACACTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 2460
                                                                                                    2841 AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 2900
            2281 ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 2340
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     d
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Ωý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                             Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 QY
                                                                                                                                                                                                                                                                                                                                                                                                                          οy
                                                                                                                                                                                                                                                                                                                                                    pp
                                                                                                                                                                                                                                                                                                                                                                              Qγ
                                                                                                                                                                                                                                                                                                                                                                                               QQ
                                                                                                                                                                                                                                                             οp
                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                  Óλ
                                                                                                                        α
                                                                                                                                                 δλ
                                                                                                                                                                    Db
                                                                                                                                                                                            Óλ
                                                                                                                                                                                                                Dp
                                                                                                                                                                                                                                         ŏ
                                                                                                                                                                                                                                                                                     δ
                                                                           qq
                                                                                                  οy
```

```
linear PAT 08-AUG-2001
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        High molecular weight surface proteins of non-typeable haemophilus
Patent: US 6218141.A 6 17-APR-2001;
Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ö
4881 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4940
                        4501 AAATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGGAAACGGGTCCTT 4560
                                        4941 AAATATACCAGCCAGGTGTAGCAAGTGTAGAAAGTAATAGAAGGAAACGCGTCCTT 5000
                                                                            4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620
                                                                                          4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAAATGAATTTACA 4680
                                                                                                                                             4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                               4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                     4801 GTAGATTICAICCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                           4861 GTTCAGTACGGCCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTÄTTTT 4920
                                                                                                                                                                                                                                                                                                                                                           5301 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTTT 5360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               61 CACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAATAGTATAAATCGGCGATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 121 AAFGGFATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                97.6%; Score 4820.2; DB 6; Length 9323;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           98.5%; Pred. No. u;
tive 0; Mismatches 73; Indels
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 DNA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /organism="unknown"
1829 c 1832 g 2528 t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         AR145901
Sequence 6 from patent US 621814;.
AR145901.1 GI:15109090
                                                                                                                                                                                                                                                                                                                                                                                                            5361 AACAGGTTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                               4921 AACAGGTTATTATTG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1 (bases 1 to 9323)
Barenkamp, S.J.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Best Local Similarity 98.58
Matches 4864; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   .9323
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Unclassified.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        3134 a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Unknown.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Unknown.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                               RESULT 10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             AR145901
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             VERSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ORIGIN
                                                                                                                              ò
                                                                                                                                                                                 δ
                                                                                                                                                                                                           Dρ
                                                                                                                                                                                                                                                             Op
                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                            ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               οp
```

Tue Mar 25 08:39:00 2003

ω	3	360	4286	480	4 8	600	660 1100	720	80	840 1280	900	960	1020	1080	14	0 4	1260	1320 1760
CITICAICTICAICTITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTIT	CATGAAATGATGAACCGAGGGAAGGGAGGGAGGGGAAGAATGAAGAGGGGGGCTGA 	GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 	TGTGTCTGAATT 	AAAAAGGCTTCGGCTATGTTACTATCTTT 	CTATCTTTAGGTGTAACATCTATTC 	CAATCTGTTTTAGCAAGGGGCTTACAAGGAATGGATGTAGTAGACGGCACAGCCACTATG	CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 	CAATITAACATGGACCAAAATGAAATGGTGCAGTTTTTACAAGAAACAACTCGGC 	TCTAA 	GGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGGGGAATTATTAAC {	ACGGCTTCTACGCTAGACATTTCTAACG 	ACCTTCGAGCAAACCAAAGATAAAGCGCTC( 	ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG 	ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACCATCAGCGAT 	NTAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAAT 	DAAAGGGGTAACATTAATGTCGGTGCTGCC 	GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCGCC 	CAAAATCAGCAAGCTAAAG 
621	241	301	361	421	481	541	601	661	721	781	841	901	961	1021	1081	1141	1201	1261
Dp	Oy Dp	Qy Db	Qy Db	Qy Db	Oy Dp	Qy Dp	Qy Db	Qy Db	Qy	Oy Dp	Qy Dp	Qy	Oy Dp	Qy	Qy	Qy	QY	Qy

	0	3601 AATGTTA        4041 AATGTTA												-		AATATC	4501 AAALALA 	1
qa o	qq	Qy Dp	Qy Db	Qy	oy O	o d	λλ qa (	op o	oy Dp	Oy Dp	Oy Db	QY	Oy DP	Qy Db	Qy Db	op Op	d d	κ
													-					_
1 AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 2460 	1 GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAA 2520 	CCAAACGAGAACATGAACACAAGCTTTACCAATTGGTTTTTAGCCAATATCACA 1111111111111111111111111111	GCCACTGGTGGGGGCTCTGTTTTTTGATATATATCCCAACCATTCTGGCAGAGGGGCT 2   1   1   1   1   1   1   1   1   1	1 GAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT 2700 	1 GTTCGCGGCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCA 2760 	1 AATTTCAGCCTCAGACGAACGAAGATGATTTTATGACGGGTACGCAGCGATGCCATC 2820 	1 AATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCA 2880 	1 AGCAGCAGTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 2940 	1 AATAACGCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC 3000	1 GTTAATGGGAGTTTAAGTTTAACTGGGGAAAATGCAGATATTAAAGGCAATCTCACTATT 3060 		1 ACCAATAATGGCACTGCCGAAATTAATATAACACAGAGGAGTGGTAAAACTTGGCAATGTT 3180 	1 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAAGGCAACCAAGGAGGATCATC 3240 	1 GGCGGAGATATAATCAACAAAAAAGGAAGCTTAAATTTACAGACAG	1 GAAAICCAAAIIGGCGGCAAIAICICGCAAAAAGAAGGCAACCICACGAIITCIICCGAI 3360 	1 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGAGGCTCTAGT 3420 	1 TCAGATGCGACAAGTAATGCCAACCTAACTAATAAAACCAAAGAATTGAAATTGAAATGAGA 3480 	1 GACCTAAGTATTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 3540
Qy 2401 Db 2841	Qy 2461 Db 2901			Oy 2641 Db 3081	Oy 2701 Db 3141	Qy 2761 Db 3201	Oy 2821 Db 3261	Oy 2881 Db 3321	Qy 2941 Db 3381	Qy 3001 Db 3441	Qy 3061 Db 3501	Qy 3121 Db 3561	Qy 3181 Db 3621	Qy 3241 Db 3681	Qy 3301 Db 3741	Qy 3361 Db 3801	Qy 3421 Db 3861	Qy 3481

3780 3960 NGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620 ITCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380 SCCACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440 ATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500 ATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 5000 4080 NATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGGAAACGCGTCCTT GGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC AAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG TCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT TCGGAAAAGGTTACCACCACCAGGCTCGACCATTAACGCAACAAATGGCAAA GCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT AATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA ACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA GCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC TCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC GCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG AAAGCAACCAGCGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT

```
qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ДD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               οχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Ωp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                       q
                                                                                                                                                                                                                                                                                                                                                                                                               δy
                                                                                                                                                                                                                                                                                                                                                                                                                                      Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                              οy
                                                                                                                                                                                           Op
                                                                                                                                                                                                                                         QΩ
                                                                                                                                                                                                                                                                  Ωy
                                                                                                                                                                                                                                                                                         Db
                                                                                                                                                                                                                                                                                                                  φ
                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                               δ
                                              qq
                                                                                           Д
                                                                                                                                           q
                                                                                                                                                                    ò
                                                                                                                                                                                                                    δλ
                       Ωÿ
                                                                       ά
                                                                                                                    οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ó
                                                                                                                                                                                                                                                                                                                                                      linear PAT 07-OCT-1996
                                                                                                                                                                                                                                                                                                                                                                                                                                         Unclassified.

I (bases 1 to 9323)

1 statenkamp, S.J. and St. Geme, J.W. III.

High molecular weight surface proteins of non-typeable haemophilus Patent: US 5549897-A 6 27-AUG-1996;
                                                                                                                                                                                                                   4681 ACCAGACCGTCAAGTGAAATTTCTGAAGGTAAGGGGGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                      4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                   GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTTAACCTTAGGAGAAAATATGAACAAG 360
5001 GAAAAAGTTAAAAGATTTATCTGATGAAGAAAGAAACATTAGCTAAACTTGGTGTAAGT 5060
                       4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAAATGAATTTACA 4680
                                                                                            5121 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 5180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           61 CACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAAAATAGTATAAATCCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  561 AATGGTATAATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTTCAT 620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  621 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTTCATCTTT 680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGGCCAAGAATGAAGAGGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  681 CACATGAAATGATGAACCGAGGAAGGGAGGGAGGGCCAAGAATGAAGAGGGGGCTGAAC 740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    501 CACCTTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATATATAAATCCGCCATATAA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         97.6%; Score 4820.2; DB 6; Length 9323; 98.5%; Pred. No. 0; Live 0; Mismatches 73; Indels 0;
                                                                                                                                                                                                                                                                                                                                                         DNA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2528 t
                                                                                                                                                                                                                                                                                                                                                     9323 bp
Sequence 6 from patent US 5549897.
125184
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Location/Qualifiers
1, .9323
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /organism="unknown"
1829 c 1832 a
                                                                                                                                                                                                                                                                                   5361 AACAGGTTATTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                          125184.1 GI:1605054
                                                                                                                                                                                                                                                                    4921 AACAGGTTATTATTG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Best_Local Similarity 98.5
Matches 4864; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           3134 a
                                                                                                                                                                                                                                                                                                                                                                                                                     Jnknown.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Query Match
                                                                                                                                                                                                                                                                                                                                                         LOCUS
DEFINITION
ACCESSION
VERSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     source
                                                                                                                                                                                                                                                                                                                                                                                                                                ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           BASE COUNT
                                                                                                                                                                                                                                                                                                                                   RESULT 11
I25184
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           COURNAT.
                                                                                                                                                                                                                                                                                                                                                                                                                                                         REFERENCE
                                                                                                                                                                       4801
                                                                                                                                                                                                                                                                                                                                                                                                         KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Ωp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                          QQ
                                                                                              Ωp
                                                                                                                      δ
                                                                                                                                            Dp
                                                                                                                                                                      ò
                                                                                                                                                                                            Dp
                                                                                                                                                                                                                      ŏλ
                                                                                                                                                                                                                                                                    δ
                                                 QΩ
                                                                       δ
```

```
1321 GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1581 GGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCTGCCATATTTTGCAAACCAA 1640
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATCTG 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1201 GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1261 AAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1761 GGCAAGCTGATAAAGTCCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1820
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1401 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG 1460
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1141 GGCGATATTTTGCCAAAGGCGGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA 1200
                                                                                                                                                                                                                                                                                                                                                             981 CAATCTGTTTTAGCAAGCGGCAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTAC 1040
                                                                                                                                                                                                                                                                                                                                                                                                                                                      1041 AAGAAAACAAGTAATAAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 1100
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            961 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG 1020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               901 TTCACCTTCGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAAATCACGGTTTAATT 960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 781 GGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900
                                                                                                                                                                                                                                                                                                                                                                                                         601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                      541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600
741 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 800
                                               361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                  421 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                481 CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1021 ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACCATCAGCGAT
```

1500	1560	1620	1680 2120	1740 2180	1800	1860 2300	1920	1980	2040	2100	2160	2220	1280	340	400	460	520
GGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC 	AAAGAAAAGGGGGACGCGCTATTGTGTGGGGCGATATTGCGTTAATTGACGGCAATATT 	AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGGAGACATCGGGGCAT 	TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 	GATCTAACAATTGAAGCCGAAGACCCCTTCGCAATAATACCGGTATAAATGATGAATTC 	CCAACAGGCACCGGTGAAGCAACCGACCCTAAAAAATAGCGAACTCAAAACAACGCTA : 	ACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCATCA : 	AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT	AGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA	AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 	GGTTTTTTAAATATTACCSCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 2 	GACECGGCAAATGCTAAAATTGTCCCCCAGGCACTGTAACCATTACAGGAGAGGGAAAA 2 	GATTTCAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTTCA 2 	CAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2 	ATTAACCAAACTACGAGAAAGACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 2 	AACGTCAGTGCTCTTAATCTAGAGACAGGGGAAATTTTACCTTTATTAATACATTTCA 2 	GCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGTGAATTTTAACGGC 2 	GTAAATGGCAACATGTCATTCAATCTCAAAGAGGAGGGAAAGTTAATTTCAAATTAAAA 2: 
1441	1501	1561	1621	1681	1741	1801	1861	1921	1981	2041 (	2101 0	2161 C	2221 T	2281 P	2341 A 1 2781 A	2401 A 1 2841 A	2461 G 1 2901 G
Qy	Oy Dp	Qy Db	Qy Db	Oy Dp	Oy Dp	Qy Db	Qy Db	Qy	Oy Dp	QY	Oy Dp	Qy Dp	Qy Db	Qy	Oy Db	Oy Dp	Qy Db

CCAAACGAGAACATGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 2580 2820 2880 2940 3000 3440 3060 3120 3560 3180 3620 3240 3740 3680 3360 3420 3601 AATGTTAAAGATTCAAAAATCTCTGGTGACGGTCACAATGTGACACTAAATAGCAAAGTG 3660 GCCACTGGTGGGGCCTCTGTTTTTTTTGATATATGCCAACCATTCTGGCAGAGGGGCT 2641 GAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT GTTCGCGGCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCA AATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCA AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC AATAACGCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC GTTAATGGGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTT 3501 TCAGAAAGGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTT ACCAATAATGGCACTGCCGAAATTAATAACACAAGGAGTGGTAAAACTTGGCAATGTT AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGGACTCTAGT ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA GAAATCCAAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 2961 2581 3141 2701 2761 3201 2821 3261 2881 3321 2941 3381 3441 3001 3121 3181 3241 3741 3061 3561 3301 3361 3421 3621 3801 3481 3541 Db δy g q qq δ ò g Qγ δ g οy g δ q Db ò ò g ŏ qq qq ò ò g ò qq ò g ò g qq ò Ω g ò

```
4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAAAGAACATTAGCTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4501 AARTATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4441 AATAICATITGGAAAGAIGGIAGAAACACIGIGCGCIIAAGAGGCAAGGAAATIGAGGIG 4500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4381 ACTGCGGCAACCTCAAGGAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                                                                                                                                                                                                                                                                                                                             4261 GATATTAAAGCAACCAGGGGACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                                                                                                                                          4201 ATTANTGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                                                                                                                                                                                                                                                      4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATGGCAGGAAGC 4200
                                                                                                                                                                                                                                                                                     4081 GAAGGAGCIGCAACCITAACGGCAACAGGGAATACCTIGACTACTGAAGCCGGTTCTAGC 4140
                                                                                                                                                                                                                                                                                               4021 AATGTTACGCCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080
                                                                                                                                                                                                                                                            3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                                                                     3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAAATCGGGT 3960
                                                                                                                                                                                    3781 ACCGCGTCGGAAAAGGTTACCACCACCACGAGCTCGACCATTAACGCAACAAATGGCAAA 3840
                                                                                                            3721 ATTACTGCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC 3780
                                                                        3661 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                               Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                   δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ď
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δλ
                                                                                                                                                                                                                                                                                                                                                                                            Ω
                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                        ŏ
                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                     δ
```

qq

δλ

ŏ

QQ

g ò

οy qq

g ò

οq

```
linear PAT 13-MAY-1997
                                                                                                                                                                                                                                                                                                                      1 (bases 1 to 9323)
Barenkamp, S.J. weight surface proteins of non-typeable haemophilus High molecular weight surface proteins of non-typeable haemophilus patent: US 5603938-A 6 18-FEB-1997;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          421 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         741 GAACGCAAATGATAAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTGTTGGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   801 ATATATGTCTCTAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   301 GAACGCAAATGATAAAGTAAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        241 CACATGAAATGATGAACCGAGGAAGGGAGGGAGGGGCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     561 AATGGTATAATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCAT 620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  121 AATGGTATAATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                0; Gaps
                   4861 GITCAGIACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAATTIT 4920
5121 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 5180
                                                                                                                                                                                                                                                                                                                                                                                                                                   97.6%; Score 4820.2; DB 6; Length 9323; 98.5%; Pred. No. 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                        Pred. No. 0;
0; Mismatches 73; Indels
                                                                                                                                                                                                                                         DNA
                                                                                                                                                                                                                                                                                                                                                                                                           2528 t
                                                                                                                                                                                                                                       135773 9323 bp
Sequence 6 from patent US 5603938.
                                                                                                                                                                                                                                                                                                                                                                        Location/Qualifiers
1. .9323
                                                                                                                                                                                                                                                                                                                                                                                             /organism="unknown"
1829 c 1832 a
                                                                                                                                                                                                                                                                             I35773.1 GI:2086997
                                                                                                                                                              4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                            5361 AACAGGTTATTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                                                                                         Best Local Similarity 98.5
Matches 4864; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                        Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                3134 a
                                                                                                                                                                                                                                                                                                      Unknown
                                                                                                                                                                                                                                                                                                                                                                                                                                                  Query Match
                                                                                                                                                                                                                                                                                                                                                                                              source
                                                                                                                                                                                                                                                                                                                                                                                                                BASE COUNT
                                                                                                                                                                                                                                                                                                                   ORGANISM
                                                                                                                                                                                                                                                                                                                                                                        JOURNAL
                                                                                                                                                                                                                                                          DEFINITION
                                                                                                                                                                                                                                                                                                                                       REFERENCE
                                                                                                                                                                                                                                                                                                                                                    AITHORS
                                                                                                                                                                                                                                                                        ACCESSION
                                                                                                                                                                                                                            RESULT 12
                                                                                                                                                                                                                                                                                                                                                                                     FEATURES
                                                                                                                                                                                                                                                                                             KEYWORDS
                                                                                                                                                                                                                                                                                                                                                              TITLE
                                                                                                                                                                                                                                                   LOCUS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               QY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Ω
                                                                                                                                                                                             αn
                                                                                                                                                   qq
                                                                                                                                                                        δŏ
                                                                                  δλ
                                                                                                      qq
                                                                                                                            δλ
                                                            g
```

2001 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTGTGGAGACATGGGGGCAT 2060 1561 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT 1620 1621 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680 1681 GATGTAACAATTGAAGGCGAAGACCCCCTTCGCAATAATACGGGTATAAATGATGAATTC 1740 1741 CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAATAGGGAACTCAAAACAACGCTA 1800 1801 ACCAATACAACTATTTCAAATTATCTGAAAACGCCTGGACAATGAATATAACGGCATCA 1860 1861 AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCGACTTAATTCTCCAT 1920 1921 AGTAAAGGTCAGCGTGGGGGGGGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA 1980 1981 AATTTAACCATTTATTGTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 2040 2421 AATTTAACCATITATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 2480 2481 GGTTTTTAAATATACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCC 2540 2041 GGTTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 2100 2161 GATTICAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTTCA 2220 2601 GATTTCAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTTCA 2660 2221 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280 2661 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATTHIIIIIIIIIIIIIIIIII 2721 ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTGGCAACCGGCATGGTTGGCAACTGG 2780 2281 ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 2340 2341 AACGICAGIGCICITAAICIAGAGACAGGCGCAAAITITACCITIAITAAAIACAITICA 2400 2781 AACGICAGIGCICITAATCIAGAGACAGGCGCAAATTITACCITTATAATAATACATICA 2840 2901 GTAAATGGCAACATGTCATTCAATGTCAAAGAAGGAGCGAAAGTAATTTCAAATTAAA 2960 2461 GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAA 2520 2521 CCAAACGAGAACATGAACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 2580 2581 GCCACTGGTGGGGGCTGTGTTTTTGATATATATGCCAACCATTGTGGGAGGGGCT 2640 2401 AGCAATAGCAAAGGCTTAACAACACTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC Op ò g ò Q ŏ Db QΩ ò ò qq ŏ g ò q qq δ ò QQ ò qq qq ò g δλ Dp δ Db ò QQ

QQ δŏ

qq ογ

δλ

δλ qq

qq ŏ q

δ

ò g

οy q

4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860 5121 ACCAGACCGTCAAGTCAAGTGATATTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 5180 4741 GGGGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCGGTAGTCAGTAATTGACAAG 4800 4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTACA 4680 4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740 4501 AAATATGCGGCCGGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560 4941 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 5000 4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620 4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440 4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500 4881 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4940 4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380 4261 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAAGCTAAATGGT 4320 4141 ATCACTICAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200 4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260 4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140 4461 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4520 3901 GTTAGGGGGACTGGTGATTTAACCACTAAATCGGGTCAAAAATTGAAGGGAAATGGGT 3960 3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTCCGGTAATACGGTA 4020 4021 AATGITACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080 4341 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 4400 3841 GCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAAGT 3900 QΥ δò qq δλ QΥ qq οp δy Dp qq οy QQ ŏλ q δλ οy g QY QQ οy qq οy Ωÿ q q δλ qq g δλ Db δy ò

```
ά
                                                           g
                                                                           δ
                                                                                              g
                                                                                                                               qq
                                                                                                                ò
                                                                                                                                                 ò
                                                                                                                                                                 g
                                                                                                                                                                                   δ
                                                                                                                                                                                                    αq
                                                                                                                                                                                                                                     Ωp
                                                                                                                                                                                                                                                       Óλ
                                                                                                                                                                                                                                                                       QΩ
                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                            δy
                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                             P
                                                                                                                                                                                                                                                                                                                                                                                               οy
                                                                                                                                                                                                                                                                                                                                                                                                                                δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                 q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     óγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δy
                                                                                                                      Journal High molicular weight surface protein of non-typeable haemophils.
                                                                                                                                                                                                                                                                                                                                                                                                                     ö
                High molroular weight surface protein of non-typeable haemophils Patent: JP 2001503602-A 4 21-MAR-2001; SENTLOUIS UNIV, WASHINGTON UNIV
5241 GTAGATTICATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 5300
                                                                                                                                                                                                                                                                                                                                                                                                                                  61 CACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAATAGTATAAATGCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             121 AATGGTATAATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCATCTTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTTCATCTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                         301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                                                                                        97.6%; Score 4817; DB 6; Length 9323;
98.5%; Pred. No. 0;
1ve 0; Mismatches 75; Indels 0;
                                                                                                                                                                                                                                                                                                                                                                                                               75; Indels
                                                                                                                                                                                                                                      JP 2001503602-A/4
21-MAR-2001
01-APR-1997 JP 1997535346
01-APR-1996 US 08/617697
STEPHEN J BARENKAMP
CO7H21/02,CO7H21/04,C12P21/06,A61K39/102
                                                                                                                     DNA
                                                                                                                                                                                                                                                                                                        Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                       /db_xref="taxon:32644"
1828 c 1833 g 2528 t

    9323
    Organism="unidentified"

                                                                                                                   9323 bp
                                                                                                                                                                                                                                                                                                                 source
/organism='Haemophils'.
                                                                                                                                                                                                                                                                                                                                Location/Qualifiers
                                                                                                                                        BD010358.1 GI:18638731
                                                   4921 AACAGGTTATTATTG 4937
                                                             5361 AACAGGTTATTATTATG 5377
                                                                                                                                                                                       1 (bases 1 to 9323)
Barenkamp, S.J.
                                                                                                                                                    2001503602-A/4.
                                                                                                                                                                                                                                                                                                                                                                                                            Conservative
                                                                                                                                                           unidentified.
                                                                                                                                                                               unclassified.
                                                                                                                                                                     unidentified
                                                                                                                                                                                                                                                                                                              source
                                                                                                                                                                                                                                                                                                                                                                                                  Similarity
                                                                                                                 BD010358
                                                                                                                                                                                                                                                                                                                                                                3134 a
                                                                                                                                                                                                                                                                                                                                                                                                        Matches 4862;
                                                                                                                                                                                                                                 OS
PP
PP
PC
CC
CC
CC
FH
                                                                                                                                                                                                                                                                                                                                                                                        Query Match
                                                                                                                       DEFINITION
                                                                                              RESULT 13
BD010358
                                                                                                                                                                   ORGANISM
                                                                                                                                                                                                                                                                                                                                        Source
                                                                                                                                  ACCESSION
                                                                                                                                                                                                                                                                                                                                                               BASE COUNT
                                                                                                                                                                                   REFERENCE
                                                                                                                                                                                            AUTHORS
                                                                                                                                                                                                               JOURNAL
                                                                                                                                                 KEYWORDS
                                                                                                                                                                                                     TITLE
                                                                                                                                                                                                                                                                                                                             FEATURES
                                                                                                                                                                                                                               COMMENT
                                 g
                 ò
                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ô
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
```

```
421 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATGTTAGGTGTAAC 480
                                                 481 CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTTTAGGTGTAACATGTATTGCA 540
                                                                                                541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600
                                                                                                                                                                               601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                      661 CAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGGC 720
                                                                                                                                                                                                                                                                                                                                                                                       721 GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     961 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAAGGAGGGTGTG 1020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1401 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGG 1460
                                                                                                                                                                                                                                                                                                                           781 GGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1021 ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAATCACCATCAGGGT 1080
                                                                                                                                                                                                                                                                                                                                                                                                                        901 TTCACCTTCGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGTTTAATT 960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGGGGTCAATCTG 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1141 GGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA 1200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1201 GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1261 AAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATGAGCAAGCTAAAGGC 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1321 GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATGGACCTT 1380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1821 TCAGGTAAAGAAGGGGAGAACTTACCTTGGCGGTGACGAGGCGCGCGAAAGTAAAAAC 1880
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1441 GGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC 1500
```

οχ qq οy qq

qq δý

Db δ g

Óγ qq Ω

δλ Q ò Ω ò Д

		B81 AGCAGCAGCATTACGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 294(	121 ACCAATAATGGCACTGCCGAAATTAATAACACAAGGAGTGGTAAAACTTGGCAATGTT 318 11.11   1   1   1   1   1   1   1   1	241 GGGGGGGGTATAATCAACAAAAAGGAAGCTTAAATATTACAGACAG	361 AAAATTP 	CRANTECCRACITATICAGGITTCAATAAAGCAGAGATTACAGCCAAAGATGG ACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGG ACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGG	981 ACTATTGGCAACAGTAATGACGGTAACAGGGGGCGCGAAGCCAAACAGTAGTTTT 981 ACTATTGGCAACAGTAATGACGGTAACAGCGTGCCGAAGCCAAACAGTATTTGGCAAACAGTAATAGCAAA 601 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAAATGTGACAATAGCAAATAGCAAA 111111111111111111111111111111111
QY 25: Db 30 QY 26 Db 30 QY 27		2 8 2 8		QY QY QY	Qy Dp	07 07 08	oy oy

```
HIU08876 9221 bp DNA linear BCT 05-AUG-1994 Agemophilus influenzae 12 adhesin (hmw.lA) gene and putative accessory processing proteins (hmw.lB) and (hmw.lC) genes, complete cds.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Direct Submission
Submitted (14-APR-1994) Stephen J. Barenkamp, Department of
Pediatrics, St. Louis University School of Medicine, Cardinal
Glennon Children's Hospital, 1465 South Grand Boulevard, St. Louis,
MO 63104-1095, USA
On Apr 29, 1994 this sequence version replaced gi:148902.
5181 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTAGTAGTAGTAGCAAG 5240
                                                  Barenkamp, 8.3 and Leininger, E. Cloning, expression, and DNA sequence analysis of genes encoding nontypeable Haemophilus influenzae high-molecular-weight surface-exposed proteins related to filamentous hemagglutinin of Infect. Immun. 60 (4), 1302-1313 (1992)
                                                                                                                         4861 GITCAGTACGGGCTTTACCCAICTIGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                                                            Haemophilus influenzae.
Haemophilus influenzae
Bacteria; Proteobacteria; gamma subdivision; Pasteurellaceae;
Haemophilus.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /db_xref="taxon:727"
/clone_lib="Lambda EMBL3 genomic library of strain 12"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Graves 5117 to 9221)
Barenkamp,S.J. and St Geme,J.W. III.
Genes encoding high-molecular-weight adhesion proteins of nontypeable Haemophilus influenzae are part of gene clusters Infect. Immun. 62 (8), 3320-3328 (1994)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                /organism="Haemophilus influenzae"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /note="surface-associated protein"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /transl_table=11
/product="adhesin"
/protein_id="AAA20527.1"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /citation=[1]
/rpt_type=tandem
351. .4961
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /note="direct"
                                                                                                                                                                                            4921 AACAGGTTATTATTA 4937
                                                                                                                                                                                                               5361 AACAGGTTATTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /codon_start=1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /gene="hmw1A"
351. .4961
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /gene="hmw1A"
                                                                                                                                                                                                                                                                                                                                                                                                        U08876.1 GI:475770
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /citation=[1]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        3 (bases 1 to 9221)
Barenkamp, S.J.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /strain="12"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1548058
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     repeat_region
                                                                                                                                                                                                                                                                                                                                   DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                          ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 source
                                                                                                                                                                                                                                                                                  RESULT 14
                                                                                                                                                                                                                                                                                                                                                                                   ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              JOURNAL
MEDLINE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             REFERENCE
AUTHORS
TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      TITLE
JOURNAL
                                                                                                                                                                                                                                                                                                   HIU08876
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                       KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PUBMED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   MEDLINE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PUBMED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       gene
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       CDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            COMMENT
                                                                                     Op
                                                                                                                         δ
                                                                                                                                                         Db
                                                                                                                                                                                            δλ
                                                                                                                                                                                                                            qq
```

```
REVFDEFFEISSNNIHERFETKÖCETFORAVFYMPSIGMDITT FEVSNIRLAPIOA
ALGHPATTHESEIDY VI VEDDY VGSEDCFSETLLRLPKDALLY VPSALAPOKVDY VL
VALGHPATTHESEIDY VI VEDDY VGSEDCFSETLLRLPKDALLY VPSALAPOKVDY VL
PRENPEVVNIGIAATHWERLLTLOEIRDKAKVKI HFHRALGOSTGLTHPYVKWFI
ESYLGDDATAHPHAPYHDY LAILRDCDMLLNPFPFGNTNG IIDMVTLGLVGVCKTGDB
VHEHIDBGLFKRLGLPEWLIADTRETY I ECALRLAENHQERLEIRRY II ENNGLÖKLF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /LTAISTATION="MTKENLOSVPONTTASLVESNNDOTSLQILKOPPKPNLLRLEQH
/ATAISTALACRELLAHTLEKUNDANFGGYHDIEFDAPAQLAYLPEKLLIHFATRLANAIT
TLFSDPELAISEEGALKMISLQRWLTLIFASSPYVNADHILNKYNINPDSEGGFHLAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   DNSSIAKFCIFYLDESNVIMSLDALMAGNOOLCASLCFALOSSRFIGTASAFHKRAVV
LOWFFKILAEIANLDELPANILHDVYMICSYDLAKNKHDYKRPLNELVRKHILTOGWO
DRYLYTLGKKDGKPVMWYLLEHFNSGHSIYRTHSTSMIAAREKFYLVGLGHEGVDNIG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /product="putative accessory processing protein"
/protein_id="AAA20529.1"
/db_xref="G1:475773"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /product="putative accessory processing protein"
/protein_id="AAA20528.1"
/db_xref="G1:475772"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /codon_start=1
/transl_table=11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /rpt_type=tandem
7062. .9014
                                                                                                                                                                                                                                                                                                                                                                                                                                                 /codon_start=1
/trans1_table=11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      6873. .6989
/note="direct"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /gene="hmwlC"
7062. .9014
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /citation=[2]
                                                                                                                                                                                                                                                                                                                                                                                  5114. .6751
/gene="hmw1B"
5114. .6751
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                /citation=[2]
                                                                                                                                                                                                                                                                                                                                                                                                           5114. .6751
/gene="hmw1B"
                                                                                                                                                                                                                                                                                                                                                                                                                                      /citation=[2]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           repeat_region
```

gene CDS gene CDS

```
1001 AAGTGAAAAACGAGGGTGTGATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGC 1060
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  881 AAAACATCAAGGGGGGTAATTTCACCTTCGAGCAAACCAAAGATAAAGGGGCTCGCTGAAA 940
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 821 GTAAAGACGCAATTATTAACACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACG 880
                                                                                                                                                                                                                                                                                                                                                                               669
                                                                                                                                                                                                                                                                                                                                                                                              640
                                                                                                                                                                                                                                                                                                                                           641 ACGCTATCATTAATTGGAAACAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTAC 700
                                                                                                                                                                                                                                                                                                     521 TAGGIGTAACATCTATTCCACAATCTGTTTTAGCAAGGGTTACAAGGAATGGATGTAG 580
                                                                                                                                                                                                                                                                                401 TIGCIGIGICTGAATTGGCACGGGGTTGTGACCATTCCACAGAAAAAGGCTTCCGCTATG 460
                                                                                                                                                                                                           341 TAGGAGAAAATATGAACAAGATATATGGICTCAAATTCAGGAAACGCCTGAATGCTTTGG 400
                                                                                                                                               41 ATGACAAACAACAATTACAACACCTTTTTTGCAGTCTATATGCAAATATTTAAAAAAAT 100
                                                                                                                                                                                                                                                                                                                                                                          54.5%; Score 2689.8; DB 1; Length 9221; 73.6%; Pred. No. 0; Live 0; Mismatches 1087; Indels 265; Gaps tive
                                                                                                                                                                                                                                                                                                                                   581 TACACGGCACAGCCACTATGCAAGTAGATGATAAAAACCATTATCCGCAACAGTGTTG
                                                                                                                                                                                                                                                                                                              461 TTACTATCTTTAGGTGTAACCACTTAGGGTTAAAGCCACTTTCCGGTATGTTACTATCTT
                                                                                                                                                                             281 GAATGAAGAGGAGGTGAACGAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCT
                                                                                                                                                                                             280 GAATGAAGGGAGGTGAACGAAGGCAAATGATAAAGTAATTTAATTGTTCAACTAACCT
                                                                                                                  TGDPRPLGKILLKKTNEWKRNDLSKK"
1866 c 1801 g 2458 t
                                         Best Local Similarity 73.6 Matches 3767; Conservative
             3096 a
                                    Query Match
             BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ÓΫ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                       Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        οy
                                                                                                                                                                                                                                                                                                                                                                                                                         QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                          ŏλ
                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                           QQ
                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                             Qγ
                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                               Óλ
                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                    QQ
                                                                                                                                                                                                                                                                                     ŏ
                                                                                                                                                                                                         ΟD
                                                                                                                                                                                                                         οy
                                                                                                                                                                                                                                       q
                                                                                                                                                                                                                                                      ò
                                                                                                                                                                           Dp
                                                                                                                                                                                           δŏ
                                                                                                                                            QQ
                                                                                                                                                             ÓΥ
```

	Q C	4 AAGATATCGCCTTTGAGAAAGGAAGCAACCAAGTC
	Óλ	2129 AGGCCACTGTAACCATTACAGGAGAGAAAAAATTTTCAAAAAAATTTTCAAAAAAAA
	QQ	2119 AAGGGACTATTACCTCAGGCAATCAAAAAGGTTTTAGATTTAAA 2188
	δy	217
	ОР	AAAMAGGGMAMA
	٥y	223
	qq	TAACCAAACTACGA 229
="	οy	2297 GAAAGACCTCGTATTGGCAAACCAGCCATATTCAATGTTTTACCTA 2295
-	qq	35
~	Οy	2357 ATCTAGAGACAGGGGCAAATTTTACCTTTAATTAAAAAAAAAA
1	Dp :	2356 ATGTTTCCGAGAGTGGCGAGTTTAACCTCACTATTGATCAACAAGG 2413
u	ον.	2414 GCTTAACAACACAGTATAGAAGCTCTGCAGGGGTCAAmmmmaaagaggaTaGTGGAG 2415
Д	Dp 5	2416 GCACACTTACCAGCCTTATATTTAAACGGGTATATATACAGGCTAAATGGCCAACA 2473
α	0y 2	2474 TGTCATICAATCTCAAAGAAGAGGAAAGTTAATTAATTAATTAATTA
Õ	Db 2	473 TTAATGTTGAACGAAATGCAAGAGTCAACTTTGAATGAAT
Οy		2534 TGAACACAAGCAAACCTTTACCAATTCGGTTTTTAAAAAAAA
qq		59
δλ		
QΩ	7	593 GIGITGAITITCACACTICTGCCCTCATCCTTAACTCTAAACTCAAACTCAAAAAAAA
οy		
ΩD	265	3 ATTCTAAATACTTTAATGTTTCAACAGGTCAAGTTTAACAAAATTCCCATGTTCGCG
ΟŶ		TCAGGCTCAA
QQ		2713 CAAAAACTGGCTTCTCAATAGAGAAAGATTAAACTTTAAATGCCACC
Οy	2768	GCCTCAGACAGACGAAAGATGATTTTTATGACGGGTACGCAAAAAAAA
ΩD	2767	ACATAACACTITTGCAAGTTGAAGGCACCGATGGAAMCAAMACACTITTGCAAGGCACCGATGGAAMCAAMACACATTTTGCAAGGAAGCACCGATGGAAMCAAMACAMAAAGAAAAAAAAAA
QY	282	B CCTACAACATATCCATTCTGGGGGAAATGTCAACGCTTGTAGCCA
QQ	2827	AAAAAACATAACCTTTGAAGGAGGTAACATCACCTTTTCTTTC
ΟŊ	2888	
QΩ	2887	AAATCGAAGGCAATGTTACTATCAATAACAACGCTAACGTTACGTTAGAAGCCAATAACG
ΟŻ	294	8 CCCCTAATCAGCAAAACATAAAGGGATAGAGTTTATAAAAACTTGGCAACATTTATAAAAACTTTGGCAACATTTATAAAAACTTTGGCAACATTTATAAAAACTTTGGCAACATTTATAAAAAACTTTGGCAACATTTATAAAAACTTTGGCAACATTTATAAAAACTTTGGCAACATTTATAAAAAACATTTGGCAACATTTATAAAAACATTTGGCAACATTTATAAAAACATTTGGCAACATTTATAAAAACATTTGGCAACATTTATAAAAAACATTTGGCAACATTTATTAAAAAACATTTGGCAACATTTATTAAAAAACATTTGGCAACATTTATTAAAAAACATTTGGCAACATTTATTAAAAAACATTTATTAAAAAACATTTGGCAACATTTATTAAAAAACATTTATTAAAAAACATTTATTA
Dp	294	7 TTGACAACCATCAAAAACCTTTAACTATTAAAAAAAAA
οy	3008	m
Dp	3001	GCAACCTTACCGCTGGAGGCAATATTGTCAATATAGCCGGAAATTTTTTTT
ογ	3068	8 GCGCCACTTTTAAAGGAAAGACTAGAGATACCTAAAATATATAAAATAAAGTA 3060
qq	3061	ACGCTAATTTCAAAGCTATCACAAATTTCACTTTTAAGCGCCCCATTTTACCAATA
δy	3128	ATGCCACTGCCGAAATTAATATAAACACAAGAGTGGTAAAAGTTGCCAAAATTTGCCAAAAAAAA
qq	3121	-

δ. γ.	3188 2	ATGGTGATTTAAACATTACCACTCAGGCTAAACGCAACCAAAGAAGCATCATCGGCGGGG	3247
3 6	248	CANADATA MAGGARAGA GARATA TACAGACAGTAATAATGATGATGCTGAAATCC TATAATCAACAAAAAAGGAGGTGATTAAATATTACAGACAG	3307
, 2	308	TCTTCCGAT          TCTTCTGAC	3367
νς α	368	ATATCACCAAACAGATAACAATCAAAAGGGTATTGATGGAGGAGGACTCTAGTTCAGATG ATATTACCAAACAAAAAAAAATTCAAAGAATTCAAAGAATTCCAGAAATTCAAGAAATTCAAAGAAATTCAAAGAAAAAAAA	3427
2 % E	428	CGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAAGACCTAA 	3487
7 6 G	488	GIATITICAGITITICAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATITAACTATTG 	3547
QY	548	GCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAACAATGTTA	3607
o do	60	AAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTGAAAAACT 	3667
o do	66	CTACCAGCAATGGCGGACGTGAAAGCAATAGCGACACGATACCGGCTTAACTATTACTG	3727 3717
QY	72	AAAAATGTAGAAGTAAAC           AAAAATGTAACAGTAAAC	3787 3777
Oy do	78	CGGAAAAGGTTACCACCACAGCAGGTCGACCATTAACGCAACAAATGGCAA CAAGGGGAAATTACCACTAAAAACAGGTACAACATTAACGCAACCACGGTAAACGTGG	3839
o y	3840		8
q	æ	AGTATCCTAGGTGGAATTGAGT	3897
οy	3840		3839
qq	3898	CACTTACTGCAACCGAGGGCGCTCTTGCTGTAAGCAATATTTCGGGCAACACCGTTACTG	3957
Qy	3840		3839
Db	3958	TTACTGCAAATAGCGGTGCATTAACCACTTTGGCAGGCTCTACAATTAAAGGAACCGAGA	4017
Qy	3840	-AGCAAGTATTACAACCAAAACAGGGATATCAGCGGTACGATTTCCGGTAACACGGTAA	3898
οy	88	GI	3958
Dp	4078	AG	7
Qy	3959	GTGAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGG 	4018
δō		TAAATGTTACGGGAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGA	07
qq	4198	H	425/

```
PAT 29-SEP-1999
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4739 ATGGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACA 4798
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4918 ATGCCGCCGACGCTCTCGCTAATATCGCTGATAACGGCCGCTAGCGGTCAGTAATTGACA 4977
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4799 AGGTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTA 4858
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4859 AAGTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTT 4918
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4619 GTGCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTA 4678
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4679 CAACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTA 4738
                                                                                                                                                    4559 ITGAAAAAGTAAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGAA 4618
                                                                                                  4199 GCATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCT 4258
                                                                                                                                                                                                                                4498 GCGCAGCATTGGGTAACCACACAGTGGTAAATGCAACCAAACGCAAATGGCTCCGGCAGCG 4557
                                                                                                                                                                                                                                                                      4439 TAAATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGG 4498
                                                                                                                                                                                                                                                                                                                                                                TGAAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCC 4558
                                               4139 GCATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAA 4198
                                                             4319 GTGATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTG 4378
                                                                                                                                                                                                                                                          4379 IGACIGCGGCAACCICAAGCAGIGIGAATAICACIGGGGAITTAAAACACAGIAAAIGGGI 4438
4079 CAGAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTA 4138
             linear
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Unclassified.
1 (bases 1 to 5116)
Barenkamp,S.J. and St. Geme,J.William. III.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        DNA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Sequence 1 from patent US 5869065.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            5098 TTAACAGGTTATTATTATG 5116
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4919 TTAACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              AR032347.1 GI:5947952
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Unknown.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    DEFINITION
ACCESSION
VERSION
KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             AUTHORS
                                                                                                                                                                                                                                                                                                                                                                    4499
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                RESULT 15
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              AR032347
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 QΫ́
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                            QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ΟŻ
                                                                                                                                                                                   q
                                                                                                                                                                                                           QY
                                                                                                                                                                                                                                   Dp
                                                                                                                                                                                                                                                              Qγ
                                                                                                                                                                                                                                                                                     q
                                                                                                                                                                                                                                                                                                                 δy
                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                   Qγ
                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                       Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         οy
                                                                                                                                ΩD
                                                                                                                                                           Qy
```

16; High molecular weight surface proteins of non-typeable haemophilus Patent: US 5869065-A 1 09-FEB-1999; ATGACAAACAACAATTACAACACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAT 100 101 AGTATAAATCCGCCATATAAAATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATC 160 161 TITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTITC 220 281 GAATGAAGAGGAGCTGAACGAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCT 340 341 TAGGAGAAAATATGAACAAGATATATGGTCTCAAATTCAGCAAACGCCTGAATGCTTTGG 400 401 TTGCTGTGTCTGAATTGGCACGGGTTGTGACCATTCCACAGAAAAAGGCTTCCGCTATG 460 TIGCTGIGICIGAATIGGCACGGGGITGIGACCATICCACAGAAAAGGCAGCAGAAAAAC 459 579 640 941 ITGTGAATCACGGTTTAATTACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCA 1000 Gaps 641 ACGCTATCATTAATTGGAAACAATTTAACATCGACCAAAATGAAATGGTGGGGGTTTTTAC 700 759 820 461 TTACTATCTTTAGGTGTAACCACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTT 521 TAGGTGTAACATCTATTCCACAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAG 581 TACACGGCACAGCACTATGCAAGTAGGTAATAAAACCATTATCGGCAACAGTGTTG 701 AAGAAAACAACTCCGCCGTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAA AAGGGATTTTAGATTCTAACGGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAG 821 GTAAAGACGCAATTATTAACACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACG 820 GTAAAGACGCAATTATTAACACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACG Length 5116; 0; Mismatches 1093; Indels 265; DB 6; Score 2680.2; Pred. No. 0; Location/Qualifiers 1. .5116 /organism="unknown" 1008 c 1037 a б 54.38; 73.58; Query Match
Best Local Similarity 73.5%
Matches 3761, Conservative 1766 a source JOURNAL BASE COUNT 100 400 640 FEATURES 761 TITLE ORIGIN à ద ò g QQ ò δ q g ò ò g ð g ô qq ò a ò g ŏ g ò g δ g ò a a ò õ

```
1001 aagtgaaaaacgagggtgtgattagcgtaaatggtggcagcatttctttactcgcaggg 1060
                                                   1121 AAAATGAAGCGGTCAATCTGGGCGATATTTTTGCCAAAGGCGGTAACATTAATGTCCGTG 1180
                                                                                                                                                                                                     1240
                                                                                                                                                                                                         1360 CAGGTGCAGTTATCGACCTTTCAGGTAAAGAGGGGGAGAACTTACCTTGGCGGTGACG 1419
                                                                                                                                                                                                                                                                                              1301 AAAATCAGCAAGCTAAAAGGCGGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAA 1360
                                                                                                                                                                                                                                                                                                                                                                                                1421 AGCCCGCCGAAGGTAAAAACGGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCT 1480
                       666
                                                                                                                                                                                                                                                                                                                                                           1420
                                                                                                                                                                                                                                                                                                                                                                                                                                                            1540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1659
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1661 AGTGGTTGCTAGACCCTGATGATGTAACAATTGAAGCCGAAGACCCCCTTCGCAATAATA 1720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                AGTGGTTGTTAGACCCGGATAATGTATCTATTAATGCAGAAAAAGAGCAGGAGCAATA 1719
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           CTTCAGAAGACGATGAATACACGGGATCCGGGAATAGTGCCAGCACCCCAAAACGAAACA 1779
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1781 GCGAACTCAAAACAACGCTAACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGA 1840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1837 TTGTTAACATCACTGCTAATCAACGCATCTATGTCAATAGCTCCATTAATTT---ATCCA 1893
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1901 ACTCCCACTTAATTCTCCATAGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAG 1960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ATGGCAGCTTAACTCTTTGGAGTGAGGCTCGGAGCGGTGGCGGCGTTGAGATTAACAACG 1953
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    TIGATGTICATAAAAATATTAGGCTTGATCAGGGTTTTTTAAATATTACCGCCGTTCCG 2068
1120 AAAATGAAGCGGTCAATCTGGGCGATATTTTTGCCAAAGGCGGTAACATTAATGTCCGTG
                                                                                                                                                                                                                                           1241 GCAATATTGTTCTTTCCGCCAAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTC
                                                                                                                                                                                                                                                          1181 CTGCCACTATTCGAAACCAAGGTAAACTTTCTGCTGATTCTGTAAGCAAAAAGCG
                                                                                                                                                                                                                                                                                                                                              1361 CAGGTGCAGTTATCGACCTTTCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACG
                                                                                                                                                                                                                                                                                                                                                                                                              1481 CAACCATCAATGTATCAGGCAAAAAAAGGCGGACGCGCTATTGTGTGGGGGGGATATTG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1541 CGTTAATTGACGGCAATATTAACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1601 TTGTGGAGACATCGGGGCATTATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1600 TIGIGGAGACGICGGGCAIGATITAITCAICAAAGACAATGCAAITGITGACGCCAAAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1961 ATATTAC-----TTCTAAAGGCGGAAATTTAACCATTTATCTGGCGGATGGG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1894
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1954
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      2009
                                     ò
                                                               qq
                                                                                         δλ
                                                                                                                Q
                                                                                                                                           δλ
                                                                                                                                                                  q
                                                                                                                                                                                            ò
                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                      q
                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                  òχ
                                                                                                                                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           q
                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ð
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
```

qq	2014 T	ttgatgttcataaaatatctcactcgggggggggtaacataaacatacagttacagctaaac 2073
δy	Z069 T	AAATGCTAAAATTGTCGCCC 212
qq	2074 A	211
Qy	2129 A	AGGCCACTGTAACCATTACAGGAGAGAAAGATTTCAGGGCTAACAACGTATCTTTAA 2188
qa	2119 4	AGGGACTATTACCTCAGGCAATCAAAAGGTTTTAGATTTAATAATGTCTCTAA 2175
0y	2189 4	23
qq	2176	223
Qy	2240 #	29
Ор	2236 #	229
δλ	2297	ıΩ.
qq	2296 1	235
QY	2357 1	ATCTAGAGACAGCGCAAATTTTACCTTTATAAATACATTTCAAGCAATAGCAAG 2413
qq	2356 1	241
Qy	2414 (	47
qq	2416 (	SCACACTTACCCAGCCTTATAATTTAAACGGTATATCATTCAACAAAGACACTACCT 2472
Qy	2474	TGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAACCAAACGAGAACA 2533
qq	2473	ITAATGTTGAACGAAATGCAAGATCAACTTTGACATCAAGGCACCAATAGGGATAAATA 2532
QY	2534	TGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACAGCCACTGGTGGG 2593
qq	~	AGTAITCTAGITTGAATTACGCATCATTAATGGAAACATTTCAGTTTCGGGAGGGGGA 2592
Qy	2594	GCTCTGTTTTTTTTGATATATATGCCAACCATTCTGGCAGAGGGCTGACTTAA 2647
qa	2593	26
Qy	2648	AAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCATGTTCGCG 2707
qq	2653	ATTCTAAATACTTTAATGTTTCAACAGGGTCAAGTTTAAGATTTAAAACTTCAGGCTCAA 2712
· Oy	2708	GCGATGACGCTTTTAAAATCAAAAGACTTAACCATAAATGCAACCAATTCAAATTTCA 2767
Db	2713	CAAAAACTGGCTTCTCAATAGAGAAAGATTTAACTTTAAATGCCACCGGAGGCA 2766
οy	2768	GCCTCAGACAGAAGATGATTTTATGACGGGTACGCACGCA
qq	2767	ACATAACACTITIGCAAGITGAAGGCACCGAIGGAAIGAITGGIAAAGGCAIIGIAGCA 2826
QY	2828	CCTACAACATATCCATTCTGGGGGGGTAATGTCACCCTTGGTGGACAAAACTCAAGCAGCA 2887
qa	2827	AAAAAAACTTTGAAGGAGGTAACATCACCTTTGGCTCCAGGAAGCCGTAACAG 2886
QY	2888	GCATTACGGGGAATATTACTATTCGAGAAAGCAGCAAATGTTACGCTAGAAGCCAATAACG 2947
Dp	2887	AAATCGAAGGCAATGTTACTATCAATAACAACGCTAACGTCACTTATCGGTTCGGATT 2946
Qy	2948	CCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGCCAGCTTGCTGGTAATG 3007
qq	2947	m
Qy	3008	GGAGTITAAGTITAACTGCCGAAAATGCAGATATTAAAGGCAATCTCACTATTTCAGAAA 3067
qq	3001	
Qy	3068	GCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTTACCAATA 3127
qa	3061	ACCCTAATITCAAAGCTATCACAAATTTCACTITTAATGTAGGCGGCTTGTTTGACAACA 3120

4197	8	4138	Db
	9 GIGAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGG	395	ΟŸ
413		4078	S S
3958	0 0	4010	a d
, c	0 - AGCAAGTATTACAACCAAAACAGGTGATALCAGCGGTACGATATCCGGTAGGTGATACCAGGTAGGTGATATCGGTGGTGAGGTGAGGTGAGGTGGTGGTGGTGGTGGTGGTG	84	δò
3888		95	Ор
0 0		84	Οy
ά	CACTTACTGCAACCGAGGGCGCTCTTGCTGTAAGCAATATTTCGGGCACAACCATTACT	<u>ග</u>	qq
3839			QΥ
68	) AGATAACCGCTCAAACAGGTAGTATCCTAGGTGGAATTGAGTCCAGCTCTGGCTCTGTAA	3838	Dp
8		3840	Qy
œ.		3778	Op
3839	CGGAAAAGGTTACCACACACAGGGCTCGACCATTAACGCAACAAATGGCAA	3788	Qy
3777		3718	QQ
3787	CAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAAACAGTAAATATCACG	3728	ò
3717	CCGGTAGTAATAACAACACTGAAGATAGCAGTGACAATAATGCCGGCTTAACTATCGATG	65	GP GD
3727	CTAGGAGCAGTGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACTATTACTG	9	3 2
3667	AAGATICAAAAATCITGCIGACGGICACAAIGIGACACIAAATAGCAAAGGGAAACAI 	3608	ογ d
3597		54	7 g
9	ATATTICAGGIIICAATAGAAGAGAGAGAGAAGAGAAAACAGTAAACATGTAAAAACAGTAAACAGTAAACAGTAAACAGTAAACAGTAAACAGAAAACAGAAAACAGAAAACAGAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAACAAAA	φ. 4 Δ. 4	a ;
54	STATIT CASCILL CANTARA CONTROL	3488	ž ž
54	CGACAAACAATGCCAATCTAACCATTAAAACCAAAGAATTGAAATTAACGCAAAGACTAAA	42	qo (
3487	CGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAAGACCTAA	3428	δy
3420		36	q
3427	Ē	36	>
, κ	AAATTGGCGCGCGATGTCTCGCAAAAAGAAGAACTAAATTGTTCTTCTTCTTCTTCTAAAATTGTCAAAATGGCGCGGTTTTTTTT	3308	<u>ک</u> و
3367	ď.		2
3307	ATATAATCAACAAAAAAGGAAGCTTAAATATTACAGACAG	3248	λ
3240		3181	qc
3247	b	3188	λ
18		n	<u>ج</u> ۾
187	ATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAAACTTGGCAATGTTACCAATG 3	3128	;

```
4079 CAGAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTA 4138
                                                 4139 GCATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAA 4198
                                                                                                                                                         4259 CGGATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATG 4318
                                                                                        GCATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCT 4258
                                                                                                                             4319 GTGATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTG 4378
                                                                                                                                                                    4379 TGACTGGGGAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGT 4438
                                                                                                                                                                                                                                                4439 TAAATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGG 4498
                                                                                                                                                                                                                                                                                     4499 TGAAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCC 4558
                                                                                                                                                                                                                                                                                                                           4559 ITGAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAA 4618
                                                                                                                                                                                                                                                                                                                                                                  GIGCIGIACGITITGITGAGCCAAAIAAIACAAITACAGICAAIACACAAAAIGAAITIA 4678
                                                                                                                                                                                                                                                                                                                                                                                                                                   CAACCAGACCGTCAAGTCAAGTGATATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTA 4738
                                                                                                                                                                                                                                                                                                                                                                                                                                             AGGTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTA 4858
                                                                                                                                                                                                                                                                                                                                                                                                        AAGTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTT 4918
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ATGGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4919 TTAACAGGTTATTATTG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     5098 TTAACAGGTTATTATTATG 5116
                                                                                                                   4199
                                                                                                                                                                                                                                                                                                                                                                                              4619
                                                                                                                                                                                                                                                                                                                                                                                                                                    4679
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4739
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4799
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4978
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4859
  ò
                                                                                           q
                                                                                                                  ò
                                                                                                                                  qq
                                                                                                                                                      ò
                                                                                                                                                                       Q
                                                                                                                                                                                                              qq
                                                                                                                                                                                              δ
                                                                                                                                                                                                                                  Qγ
                                                                                                                                                                                                                                                      셤
                                                                                                                                                                                                                                                                                          ΩD
                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                δ
                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                             ŏ
                                                                                                                                                                                                                                                                                                                                                                                                            QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
```

Search completed: March 22, 2003, 00:41:58 Job time : 12519 secs

```
(without alignments)
12231.150 Million cell updates/sec
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     N. Geneseq_101002:*

N. Geneseq_101002:*

| SIDS2/gcddata/geneseq/geneseqn-embl/NA1981_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1981_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1981_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1984_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1984_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1986_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1986_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1986_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1990_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1990_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1991_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1990_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1990_DAT:*
| SIDS2/gcddata/geneseq/geneseqn-embl/NA1991_DAT:*
| SIDS2/gcddata
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1 taaatatacaagataataataaa.....ttaacaggttattattatg 4937
                                                                                                                                                                                                                                                                                        March 21, 2003, 15:43:31 ; Search time 909 Seconds
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4370478
GenCore version 5.1.4_p5_4578 Copyright (c) 1993 - 2003 Compugen Ltd.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Total number of hits satisfying chosen parameters:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            2185239 seqs, 1125999159 residues
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Maximum Match 100%
Listing first 45 summaries
                                                                                                                                                                                                  OM nucleic - nucleic search, using sw model
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Scoring table: IDENTITY_NUC Gapext 1.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    N_Geneseq_101002:*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Minimum DB seq length: 0
Maximum DB seq length: 200000000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Post-processing: Minimum Match 0%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    US-10-092-880-3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Perfect score:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Database :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Searched:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Sednence:
                                                                                                                                                                                                                                                                                                                          Run on:
```

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

		Description	Non-typeable Haemo	Sequence encoding	Haemophilus influe	Haemophilus high m	Gene cluster for h	Non-typeable Haemo	DNA encoding Haemo	Sequence encoding	Haemophilus high m
SUMMARIES		ΩI	AAT90995	AA049507	AAA52197	AAQ72294	AAQ49509	AAT90997	AAA52198	AAQ49506	AA072293
		DB	18	14	21	15	14	18	21	14	'n
		Query Match Length DB	4937	4937	4940	4937	9323	9323	3263	5116	5116
	œ	Query Match	100.0	100.0	2 66	99.5	97.8	97.6	66.1	54.3	7
		Score	4937	4935 4	4924	4913	4828.2	4820.2	3263	2680.2	26000
		Result No.	-	, (	9 (1	4	· 10	ı ve	, ,	- 00	0

Non-typeable Haemo	Haemophilus influe			Non-typeable Haemo	Partial sequence e			DNA encoding H. in			Haemophilus influe	DNA encoding H. in	DNA encoding Haemo	Haemophilus high m	Partial sequence e	infl	Э.		Haemophilus influe		b		•	nacinopinatas ritado		DNA effecting namin	Haemophilus influe	DNA encoding B. Its	Haemophilus infine		DNA encoding H. in		Drosophila melanog	Haemophilus inilue	1	Human GPCR protein	
AAT90994	AAA52195	AAQ49508	AAT90996	AAT90993	AA049511	AA072296	AAT90992	AAA52188	AAA52187	44452185	AAA52191	AAA52186	AAA52192	AA072295	AA049510	AAA52177	AAA52178	AAA52182	2222	AAAC2101	AAA32103	AAA32190	AAA32190	AAA52183	AAA52184	AAA52194	AAA52193	AAA52180	AAA52179	AAA52175	AAA52176	AAA52165	ABL18982	7 AAT42063	AAA52164		
18	21	14	18	18	14	100	6	2.5	15	1,5	1,5	2.5	10	15	14	15	1,5	1 5	1 .	4 6	7 7	77	7 7	21	21	21	21	21	21	21	21	21	23	17	21	2	1
	5116																												585	681	3663	105	2279	1830121	)	112100	6171
5.4.3	54.3													ο α ο ο ο							24.1						15.3			2		· -	1.3				7.7
2680.2	000	2677	25.55.4	, ,	0 0000	0.0000	2.2022	15010			100			1401.2	) (		1414	1397.0		1298.4		_	1125.4	1081.2	1068	753.6	753.6	643.2	643 2		800		4	α		•	9.09
0		17	4 6	7 -	# U	0 4	1 C	\ C	00	7 0	7.0	77	77	2 4	4 1	0 1	9 0	7 0	200	53	30	31	32	33	34	35	3 6	37	ά	0 0	4 5	7	4.2	1 .	7 <		40
																																ţ					O

## TOWENTS

AAT90995 standard; DNA; 4937 BP.

```
Non-typeable Haemophilus; high molecular weight surface protein; HMW2; hmw2 gene; immunogen; vaccine; otitis media; ss.
                          Non-typeable Haemophilus high mol.wt. surface protein hmw2 gene.
                                                                                       Location/Qualifiers 341..345
                                                                                                         /*tag= a
129..135
/*tag= b
/rpt_type= TANDEM
136..142
                                                                                                                                                                                  /rpt_type= TANDEM
                                                                                                                                                                                                     /*tag= e
/rpt_type= TANDEM
157..163
                                                                                                                                                   /*tag= c
/rpt_type= TANDEM
143..149
                                                                      Haemophilus influenzae strain 12.
              14-APR-1998 (first entry)
                                                                                                                                                                                                                              /*tag=
                                                                                                                                                                            /*tag=
                                                                                                                                           repeat_unit
                                                                                                                                                                    repeat_unit
                                                                                                                                                                                                                      repeat_unit
                                                                                                                                                                                             repeat_unit
                                                                                                                   repeat_unit
AAT90995;
```

```
/rpt_type= TANDEM
164..170
                 /rpt_type= randem
171..177
                                 'rpt_type= TANDEM
.78..184
                                                 /rpt_type= TANDEM
185..191
                                                                 'rpt_type= TANDEM
192..198
                                                                                'rpt_type= TANDEM
.99..205
                                                                                               /rpt_type= TANDEM
206..212
                                                                                                              /rpt_type= TANDEM
213..219
                                                                                                                                         /*tag= o
/rpt_type= TANDEM
227..233
                                                                                                                                                       /*tag= p
/rpt_type= TANDEM
234..240
                                                                                                                              /rpt_type= TANDEM
220..226
                                                                                                                                                                                                                                                                                                                                    97WO-US04707.
                                                                                                                                                                                                                                                                                                                                              96US-0617697.
                           /*tag= h
            /*tag=
                                           /*tag=
                                                           ′*tag=
                                                                                                                         /*tag=
                                                                           '*tag=
                                                                                           /*tag=
                                                                                                          /*tag=
                                                                                                                                                                         /*tag=
                                                                                                                                                                                        /*tag=
                                                                                                                                                                                                                                                                                                                                                        (BARE/) BARENKAMP S J.
                                                                                                                                                                                                                                                                                                                                                                            WPI; 1997-503038/46.
P-PSDB; AAW30294.
      repeat_unit
                                                                                                                                                                                                                                                                                                                                                                  Barenkamp SJ;
                      repeat_unit
                                     repeat_unit
                                                     repeat_unit
                                                                     repeat_unit
                                                                                     repeat_unit
                                                                                                    repeat_unit
                                                                                                                   repeat_unit
                                                                                                                                   repeat_unit
                                                                                                                                                                                                                                                                                                              WO9736914-A1
                                                                                                                                                                                                                                                                                                                                   01-APR-1997;
                                                                                                                                                                                                                                                                                                                                              01-APR-1996;
                                                                                                                                                   repeat_unit
                                                                                                                                                                  repeat_unit
                                                                                                                                                                                                                                                                                                                        09-OCT-1997
```

```
6..1638, aa:Asp)
1..1653, aa:Asp)
4..1656, aa:Ala)
5..1677, aa:Phe)
                                                                                                                                                                                                       .480, aa:Arg)
..1623, aa:Asp)
..1629, aa:Phe)
                                                                                                                                                                                                                                                                                                                                              aa:Asn)
aa:Ser)
                                                                  (pos:454.456, aa:clu)
(pos:467.459, aa:clu)
(pos:463.465, aa:ha)
(pos:466.468, aa:Ala)
(pos:466.468, aa:Arg)
(pos:469.471, aa:hrg)
(pos:472.477, aa:lys)
(pos:478.480, aa:lys)
(pos:478.480, aa:Asg)
                                                                                                                                                                                                                                                               aa:Lys)
                                                                                                                                                                                                                                                                                                                                         /transl_except= (pos:1681..1683,
/transl_except= (pos:1687..1689,
/transl_except= (pos:1693..1695,
/transl_except= (pos:1711..1713)
'rpt_type= randem
152..4785
                                                                  /transl_except= (/transl_except= /transl_except= (
                                                                                                                                                                                                                                                                    /transl_except= (
/transl_except= (
/transl_except= (
                                                  /transl_except=
                                                                                                                                     /transl_except=
/transl_except=
                                                                                                                                                                     /transl_except=
/transl_except=
                                                                                                                                                                                                                                      /transl_except=/transl_except=
                                                                                                                    /transl_except=
                                                                                                                                                                                                       /transl_except=
                                                                                                                                                                                                                       /transl_except=
                                                                                                                                                                                                                                                                                                                        /transl_except=
```

```
This nucleic acid comprises the hmw2 gene of non-typeable
Haemophius influenzae strain 12 that encodes high molecular
Weight surface protein HWW2 (see AAW30294). A phage genomic
library of strain 12 was screened for clones expressing high
Strongly reactive clones were subcloned into T7 expression
plasmid; all expressed either 120 kba HWW2 or 125 kba HWW1 (see
AAW30293). The expressed proteins are truncated, starting at
correct processing requires the products of additional
correct processing requires and peptides can be used in antigens for detection of these antibodies. The nucleic acid
correct processing requires the products and as
correct processing requires and peptides can be used as to prepare recombinant proteins and as
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        61 CACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAATAGTATAAATCCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 241 CACATGAAATGATGAACCGAGGGAAGGGAGGGGGGAAGAATGAAGAGGGGGGGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  .;
0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           DB 18; Length 4937;
High molecular weight proteins of non-typeable Haemophilus influenzae - useful for vaccine production
                                                                                                                                                                                                                                                                                                                                                                                                                                                           Sequence 4937 BP; 1729 A; 948 C; 1009 G; 1251 T; 0 other;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                0; Indels
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   100.0%; Score 4937; 100.0%; Pred. No. 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          0; Mismatches
                                                      Claim 7; Page 71-73; 183pp; English.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Matches 4937; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Best Local Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     601
g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ΩD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
```

ó

0.7 661 0.7 721 0.9 721 0.9 721 0.9 841 0.9 841 0.9 901 0.0 901 0.0 1081 0.0 1082 0.0 1083 0.0 120 0.0 120

CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAATAGCGAACTCAAAACAACGCTA 1800	AGTAAAGGTCAACGGAGGGGGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA 1980	GGTTTTTTAAATATTACGGCGCGCTTCCGTAGGTTTTGAGGGGGAAA 216 GACGGGGCAAATGTTGCGCCCGGGGCATGTAACCATTACGGGGGAAA 216 [	TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATTATCTGGGAATATAACA 228 [	AACGICAGTGCTTAATCTAGAGACAGGCGCAAATTTACCTITATTAATAATTACTTTC 2400   AACGICAGTGCTTTAATCTAGAGACAGGCGCAAATTTACCTTTATTAATAATTACTTTC 2400   AACGICAGTGCTTTAATCTAGACAGGCGCAAATTTAACCTTTAATAAATA	GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAA 2520	1 G G	1 GAGTTAAAAATGAGTGAAATTAATATCILIAACGGCGCTTAACGTTAATGCAACTCA 276 1 GTTCGCGCGCGATGACGCTTTTAAAATCAACGATCA 276 1 HILLIHIHIHIHIHIHIHIHIHIHIHIHIHIHIHIHIHI	61 AATTTCAGCCTCAGACAAAGATGATTTTTTTAGACGGATACGCAGAATGCACTC ZAZU 
1741 (1741 (1801) 1801 (1861) 1861	21 21 81 81	2041 2101 2101 2161 2161	2221 2221 2281 2281	2341 2341 2401 2401	2461 2461 2521 2521	58 58 64	264 270 270	276 276 282
Qy Db Oy Qy Db	Qy Db Qy Db	0	Oy Db Oy Db	QY Db Qy Db	Oy Oy Ob	Oy Db	DP DP	Oy Oy

3901 GTTACCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960 3961 GAGGCTAATGTAACAAGTGCAACAGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020 4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAAÍGCGACA 4080 4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140 4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACGTGGCAGGCTCG 4260 4261 GATATTAAAGCAACCAGGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320 4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380 4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440 4441 AATATCATTTCGAAAGATGGTAGAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500 4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560 4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620 4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680 4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800 4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860 4861 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920 4861 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920 4141 ATCACTICAACTAAGGGICAGGIAGACCICITGGCICAGAATGGIAGCAICGCAGGAAGC 4921 AACAGGTTATTATG 4937 4921 AACAGGTTATTATTG 4937 ò qq ŏ a δ QQ ŏ g qq ά ò g ŏ qq ò q Ωp ò ò qq δy qq QΩ ò qq ŏ ò q δλ qq ò δy

RESULT 2 AAQ49507

Db ΟY qq Ω qq δ QQ qq ÓΥ g QΥ 

361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420 241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGCCAAGAATGAAGAGGGGGGGAGCTGAAC 300 301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTTAAGGAGAAAATATGAACAAG 360 121 AATGGTATAATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCAT 180 The isolation and purification of the high molecular weight protein enables the identification of the major protective epitopes of the protein by conventional epitope mapping. These epitopes can then be synthesised using standard techniques and incorporated into fully synthetic or recombinant vaccines. 0; Gaps 100.0%; Score 4935.4; DB 14; Length 4937; 100.0%; Pred. No. 0; tive 0; Mismatches 1; Indels 0; Ga Sequence 4937 BP; 1729 A; 947 C; 1010 G; 1251 T; 0 other; High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties  $\label{eq:misc_difference_logs} $$ $/ transl\_except= ACA encodes Serine. $$ $/ transl\_except= GAA encodes Asparagine. $$ misc_difference 3913..3915$ /transl\_except= GGT encodes Valine (INRM ) INSERM INST NAT SANTE & RECH MEDICALE. Claim 4; Figure 3; 100pp; English. Query Match 100.0%; Best Local Similarity 100.0%; Matches 4936; Conservative 93WO-US02166 92GB-0005704 /\*tag= (BARE/) BARENKAMP S J. WPI; 1993-320683/40. P-PSDB; AAR41724. Barenkamp SJ; 16-MAR-1993; 16-MAR-1992; 30-SEP-1993. WO9319090-A

ö

ą	2641 (	SAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT 2700	
<u>^</u>	701	CGCGGCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTC	
, g	01		
24 Op	2761	AATITCAGCCTCAGACAGACGAAAGATGATTITTATGACGGGTACGCACGCAATGCCATC 2820 	
λζ Qg	21	AATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAACTCA 2880 	
λ Op	81	AGCAGCAGCATTACGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 2940 	
ογ Op	941	AATAACGCCCCTAATCAGCAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC 3000 	
Ογ Db	00	GTTAATGGGAGTTTAAGTTTAACTGGGGAAAATGCAGATATTAAAGGCAATCTCACTATT 3060 	
QY Dp	3061	312	
Qy Dp	3121	T 318   T 318	
QY		ACCAATGATGGTGATTTAAACATTACCACTCAGGCTAAACGCAAAGAAGAAGCATCATC 3240 	
Oy Dp	24	GGCGGAGATATAATCAACAAAAAAGGAAGCTTAAATATTACAGACAG	
Qy Db	0 0	GAAATCCAAATTGGGGGGAATATCTCGCAAAAGAAGGAACCTCACGATTCTTCCGAT 3360 	
oy og	3361	342	
Qy Db	42		
δy Dp	4 4	GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 354 	
Qý Dp	54	ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 360	
Qy Dp	3601	AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 366 	
Qy	3661	AA -	
oy do	72		

g

q ò

Dp δy

Db

Dρ δ Db ŏ

ò

4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800 4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860 4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTACA 4680 4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380 4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAAACACAGTAAATGGGTTA 4440 4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500 4501 AAATATTCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560 4561 GAAAAAGTAAAAGATTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620 GATATTAAAGCAACCAGCGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320 ATTAATGCTGCTAAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260 4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACGTGGCAGGCTCG 4260 4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080 4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140 3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020 3781 ACCGCGTCGGAAAAGGTTACCACCACACAGCTCGACCATTAACGCAACAAATGGCAAA 3840 3841 GCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAAGT 3900 4261 3961 Db g ΟŽ Db QQ òχ δ QY Db qq δ qq δy П рp Qλ qq Qy qq QΥ g ολ q οy οy QQ ŏλ qq òγ

```
The invention relates to the recombinant production of Haemophilus influenzae high molecular weight (HWW) proteins in Escherichia coli. The expression construct used to effect recombinant expression comprises a promoter functional in E. coli (e.g., the T7 promoter) operably linked in a modified huwABC operon from a non-typeable (non-encapsulated) H. Clusters termed huwABC operon form a non-typeable (non-encapsulated) H. Clusters termed huwABC and huwABC. Each huwABC operon comprises huwA gene in the huwB and huwC genes. The huwA genes encode the structural HWMA proteins and the huwB and huwC genes encode accessory proteins which are responsible for post-translational processing and secretion of the HWWA proteins. The modified huwABC operon used in the expression construct of the invention contains an A gene modified such that it encodes only the cand HWMA. The invention also discloses huwA genes (AAAS175-A52198) strains Joyc, K1, K21, LCDC2, PHH1, 15 and 12. The nucleic acids and vectors are used for the production of recombinant H, influenzae HWW cretins which can be used as vaccines to mediate a humoral or cell-mediated immune response to provide protection against diseases in
                                                                                                                                                                                                                                                                                                                                              HMW protein; hmw gene; hmwAl; hmwA2; high molecular weight; non-typeable Haemophilus influenzae; WTH1; non-encapsulated; recombinant production; Escherichia col1; antibacterial; vaccine; human disease; otitis media; epiglottitis; pneumonia; tracheobronchitis;
4861 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                 4861 GITCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTT 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Nucleic acid molecule for producing recombinant high molecular weight
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  /product= "Haemophilus influenzae strain 12 HMW2A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              proteins of Haemophilus which are used as a vaccine to provide protection against Haemophilus induced diseases in humans -
                                                                                                                                                                                                                                                                                                          Haemophilus influenzae strain 12 hmw2A gene, SEQ ID NO:70.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Example 16; Fig 29A-N; 307pp; English.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Location/Qualifiers
352..4785
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             protein"
                                                                                                                                                                                                                                                                                                                                                                                                                                                        Haemophilus influenzae strain 12.
                                                                                                                                                                                               AAA52197 standard; DNA; 4940 BP.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Loosmore SM, Yang Y, Klein MH;
                                                                                                       4921 AACAGGTTATTATTG 4937
                                                                        AACAGGTTATTATTG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  98US-0206942.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                99WO-CA00938
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  98US-0167568
                                                                                                                                                                                                                                                                             (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (CONN-) CONNAUGHT LAB LTD.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Ø
                                                                                                                                                                                                                                                                                                                                                                                                                       detection; diagnosis; ds.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /*tag=
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       2000-303789/26.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            P-PSDB; AAB01848.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   WO200020609-A2.
                                                                                                                                                                                                                                                                          11-SEP-2000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          07-0CT-1999;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        13-APR-2000.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 07-OCT-1998;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                08-DEC-1998;
                                                                                                                                                                                                                                       AAA52197;
                                                                                                                                                              RESULT 3
AAA52197
                                                                                                                                                                                                                                   qq
                                                                      δ
                                                                                                       g
```

```
1;
humans caused by H. influenzae (e.g., otitis media, epiglottitis, pneumonia and tracheobronchitis). The HMW proteins are also useful as antigens in immunoassays for detecting antibodies against Haemophilus, HMW proteins and/or HWW peptides. The nucleotide sequences encoding the mon-typeable strains of Haemophilus via hybridisation reactions. The present sequence represents an hmwA gene from other
                                                                                                                                                                                                                                                              61 CACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCGGCCATATAA 120
                                                                                                                                                                                                                                                                                       121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                           240
                                                                                                                                                                                                                                                                                                                                                                                                                                        1 TAAATATACAAGATAATAAAATAAATCAAGATTTTTGTGATGACAACAACAATTACAA 60
                                                                                                                                                                                                                         300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          360
                                                                                                                                                                                         3; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900
                                                                                                                                                                                                                                                                                                                                                                    181 CITICATCITICATCTITCATCTITCATCTITCATCTITCATCTITCATCTTTCATCTTT
                                                                                                                                                                                                                                                                                                                                                                                    241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGCAAGAATGAAGAGGGGGCTGAAC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        301 GAACGCAAATGATAAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 481 CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     421 CGGGGTTGTGACCATTCCACAGAAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CAATITAACATGGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    99.7%; Score 4924; DB 21; Length 4940; 99.9%; Pred. No. 0; tive 0; Mismatches 0; Indels 3;
                                                                                                                       Sequence 4940 BP; 1729 A; 948 C; 1011 G; 1252 T; 0 other;
                                                                                                                                                                            Matches 4937; Conservative
                                                                                                                                                    Query Match
Best Local Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                541
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     601
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        661
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  661
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             721
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        721
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                781
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       841
    g
                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                       q
                                                                                                                                                                                                                                                                                                                 ó
                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                      δλ
                                                                                                                                                                                                                                                                                                                                                                                              q
                                                                                                                                                                                                                                                                                                                                                                                                                           δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                   q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             á
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
```

qa	841	CTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900	
Qy	901	CACCTT	
QQ	901	ICACCTICGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGTTTAATT 9	
Oy	61	ACTOTICGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG 1020	
qq	961	CTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAAGGGTGTCTGTG 102	
Q.	0 0	ATTAGCGTAAATGGTGGCAGCATTCTTTACTCGCAGGGCAAAAAATGACCATCAGGGT 1080	
gg	N	AGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCCAGGGCCAGGGGCCAGGGGTGGGGTGGGGGGGG	
δō.	80	ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCTGAAAATGAAGGGGTCAATCT	
QQ	1081	AATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGGAAAATGGAGGGGGTCAATGTG 1114	
· Qy	4	5 6	
Dp	1141	gcgatattttgccaaaggcggtaacattaatgtccgtgctgccactattcgaaaccaa 120	
Qy	1201	26	
QQ	1201	GTAAACITICIGCIGATICIGIAAGCAAAGATAAAAGCGGCAATATIGTICITICCGCC 126	
Qy	1261	32	
qa	1261	SAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 1320	
Oy	~ ~		
අධ	1321	GCAAGCTGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGIIAICGACCII 1330	
Οy	1381	TCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACGAGCGCGGCGAGGTAAAAAC 1440	
QQ	1381	CAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACGAGGCGGGGGGAAGGTAAAAAC 144	
δŏ	1441	50	
qq	1441	GCATICAATIAGCAAAGAAAACCICTITAGAAAAGGCICAACCATCAATGIATCAGGC 150	
QY	1501	26	
qa	1501	SARARAGGCGGACGCCTATTGTGTGGGCCGATATTGCGTTAATTGACGCCAATATT 156	
Qy	1561	9	
pp	1561	SCICAAGGIAGIGGIGAIAICGCIAAAACCGGIGGIGGIITITGIGGAGACAICGGGG 162	
Qy	1618	9	
qq	1621	ATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCT 168	_
ογ	1678	7	
qq	1681	ATGATGTAACAATTGAAGCCGAAGACCCCCTTCGCAATAATACCGGTATAAATGATGA 174	_
QY	1738	7	
qa	1741	SCCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAAAAGGGGAACTCAAAACAACG 180	_
QY	1798	8	_
qq	1801	aaccaatacaactattcaaattatctgaaaacgcctggacaatgaatataacggca 186	_
Qy	1858	TCAAGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCCACTTAATTCTC 191	_
qa	1861	AGGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTC 19	_
Oy	1918	CATAGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGC 1977	_
QQ	1921	CATAGTAAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGG	0

ATTTCAGAAAGCGCCACTTTAAAGGAAAGACTACAGATACCCTAAATATCACCGGCAAT 3117	ATCGGCGGAGATATAATCAACAAAAAGGAACCTTAATATTACAGACGTGATAATGT 329  ATCGGCGGAGATATAATCAACAAAAAGGAACCTTAAATATTACAGACACAGTAATAATGT 329  ATCGCGGGAAATCAACAAAAAAGGAAGCTTAAATATTACAGACAG	CCTAAGTATTCAGGTTTCAATAAAGGAGGATTACAGCCAAAGATGAAATT  CCTAAGTATTTCAGGTTTCAATAAAGGAGAGATTACAGCCAAAGATGGTAG  CCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAG  (1)	ATTACTGCAAAAAATGTAGAAGTAAACAAAATTACTTCTTCTCAAAACAGTAAAT 377  ATTACTGCAAAAAATGTAGAAGTAAACAAGATATTACTTCTTCTCAAAACAGTAAAT 377  ATTACTGCAAAAAATGTAGAAGTAAACAAGATATTACTTCTTCTCAAAACAGTAAAT 378  ACCGCGTCGGAAAAGGTTACCACACAGCAGCTCGACCATTAACGCAAAAAGGC 3843  ACCGCGTCGGAAAAGGTTACCACCACAGCAGCTCGACCATTAACGCAAAAAAAA	GGTGAGGCTAATGTAACAAGTGCAACAGGTACAATTGCGGGACAATTTCCGGTAATACG 4017
3058 A7 3061 A7 3118 TT 3121 TT 3178 GT 3178 GT	3238 AT 3241 AT 3298 GC 3301 GC 3358 GA 3351 GA 3421 AG	3478 GAA 3538 TTF 3541 TTF 3541 TTF 3591 AAC 3601 AAC 3658 GTG	718 778 81 38 41 41 01	1958 1961 018 021 078 081
Oy Oy Oy Oy	67 67 69 69 69 69 69 69 69 69 69 69 69 69 69	0 y O y O y O y O y O y O y O y O y O y		Oy 3 Oy 4 Oy 4 Oy 4 Oy 4

```
4198 AGCATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGC 4257
                                                                                             4258 TCGGATATTAAAGCAACCAGGGCACCTTGGTTATTAACGCAAAAGATGCTAAGGTAAAT 4317
                                                                                                           4261 TCGGATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAAT 4320
                                                                                                                                                  4318 GGTGATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGGGGCTCTGGTAGT 4377
                                                                                                                                                                   4381 GTGACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGG 4440
                                                                                                                                                                                                                                                                        4378 GTGACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGATAAATGGG 4437
                                                                                                                                                                                                                                                          4438 ITAAATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAG 4497
                                                                                                                                                                                                                                                                                                                               4561 CTTGAAAAAGTAAAAGATTATCTGATGAAGAAAGAAACATTAGCTAAACTTGGTGTA 4620
                                                                                                                                                                                                                                                                                                              4498 GTGAAATATATCCAGGCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTC 4557
                                                                                                                                                                                                                                                                                                                                                                 4558 CTTGAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTA 4617
                                                                                                                                                                                                                                                                                                                                                                                                                     4618 AGTECTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTT 4677
                                                                                                                                                                                                                                                                                                                                                                                                                                     4678 ACAACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGT 4737
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4738 AATGGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGAC 4797
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              4798 AAGGTAGATTTCATCCTGCAATGAAGTCATTTTATTTTGGTATTATTACTGTGTGGGTT 4857
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4858 AAAGTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATT 4917
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4861 AAAGTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAAAAGTATT 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         High molecular weight protein; HMW2; protective vaccine; otitis;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Haemophilus high molecular weight protein HMW2 DNA sequence.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     AAQ72294 standard; DNA; 4937 BP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4918 TTTAACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4921 TTTAACAGGTTATTATTG 4940
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               sinusitis; bronchitis; Hib; ss.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           25-JUN-1995 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Haemophilus.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  WO9421290-A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  AAQ72294;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          AAQ72294
ID AAQ7
XX
AC AAQ7
XX
DT 25-C
                                                                                                                        g
                                                                                               δ
                                                                                                                                                   ò
                                                                                                                                                                           q
                                                                                                                                                                                                       ò
                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                          ŏ
                                                                                                                                                                                                                                                                                    Ωp
                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                       QΩ
                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XX
XX
XX
XX
XX
XX
XX
XX
XX
XX
```

us-10-092-880-3.rng

```
QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Óχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ^{\circ}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Ω
                                                                                                                                                                                                                                                                                                                      q
                                                                                                                                                                                                                                                                                                                                                                Dβ
                                                                                                                                                                                                                                                                                                                                                                                                          op
                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ōλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                           g
                                                                                                     d
                                                                                                                           ŏ
                                                                                                                                               q
                                                                                                                                                                      δλ
                                                                                                                                                                                        qq
                                                                                                                                                                                                               δy
                                                                                                                                                                                                                                  Ω
                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                     òγ
                                                                                                                                                                                                                                                                                                                                                                                                                               Qγ
                                       òγ
                                                                                  οy
                                                                                                                                                                                                                                                                                                                                   0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       421 CGGGGTTGTGTGCCATTCCACAGAAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACGGCACATTG 600
                                                                                                                                                                                                                                                                                                                                                                                                             181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTTCATCTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGCAAGAATGAAGAGGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTGTCTGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                               protect against disease caused by non-typeable Haemophilus which are not controlled by H. influenzae type b (Hib) vaccines. The encoded protein can also be used as a carrier for protective Hib polysaccharide (in a conjugate vaccin against meningitis) or for other antigens, haptens, etc. This DNA sequence is part of a larger sequence encoding a gene cluster for the hmw2 gene (9323 bp).
                                                                                                                                                                                                                                                                                                                                   0; Gaps
                                                                                                                                                                                                                                                                                                                                                        The HMW2 protein encoded by this sequence is useful in a vaccine to
                                                                                                                                                                                                                                                                                                           Query Match
99.5%; Score 4913; DB 15; Length 4937;
Best Local Similarity 99.7%; Pred. No. 0;
Matches 4922; Conservative 0; Mismatches 15; Indels 0;
                                                                                                                                                                                                                                                                                        Sequence 4937 BP; 1728 A; 949 C; 1008 G; 1252 T; 0 other;
                                                                                                                                                  New immunogenic high mol. wt. proteins of non typeable Haemophilus - useful in protective vaccines
                                                                                                                                                                                 Claim 3; Page 36; 127pp; English.
                     94WO-US02550.
                                          93US-0038682.
                                                                                              Barenkamp SJ, St GEME JW;
                                                               (BARE/) BARENKAMP S J. (SGEM/) ST GEME J W.
                                                                                                                  WPI; 1994-316665/39.
                                                                                                                              P-PSDB; AAR63506
                     15-MAR-1994;
                                          .6-MAR-1993;
29-SEP-1994
                                                                                                                                                                                                                                                                                                                 Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            q
                                                                                                                                                                                                                                                                                                                                                                             Dp
                                                                                                                                                                                                                                                                                                                                                                                                   οy
                                                                                                                                                                                                                                                                                                                                                                                                                       Ωp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Ωp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δŏ
οy
                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Ω
```

```
1201 GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1261 AAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1321 GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1381 TCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACGAGCGCGGCGAAGGTAAAAAC 1440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1381 TCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACGAGGCGCGCGAAGGTAAAAAC 1440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1441 GGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC 1500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1501 AAAGAAAAAGGCGGACGCGCTATTGTGTGGGGCGATATTGCGTTAATTGACGGCAATATT 1560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1561 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT 1620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1621 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1681 GATGTAACAATTGAAGCCGGAAGACCCCCTTCGCAATAATACCGGTATAAATGATGAATTC 1740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1021 ATTAGCGTAAATGGTGGCAGCATTCTTTACTCGCAGGGCAAAAAATCACCATCAGCGAT 1080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATCTG 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATCTG 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1141 GGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA 1200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             961 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG 1020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1021 ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACCATCAGCGAT 1080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            TICACCTICGAGCAAACCAAAGAIAAAGCGCTCGCTGAAATTGTGAATCACGGTTTAATT 960
721 GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780
                                                                                                                                                                                                                781 GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                               781 GGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                                                                             41 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGCTAAT 900
```

2940 2940 3000 3060 3120 3180 3180 3240 3300 3360 3060 3300 3360 3420 3420 3480 3660 3720 3780 3840 AATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCA AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAAATGTTACGCTAGAAGCC AATAACGCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC GTTAATGGGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTT TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAAGCCAAAGAATTGAAAAA ACCAATAATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGCAATGTT **ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC** GAAATCCAAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGGGACTCTAGT GACCTAAGTATTCAGGTTTCAATAAAGCAGAGTTACAGCCAAAGATGGTAGAGATTTA ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCCAAAACAGTAACTTTTAAC AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3721 ATTACTGCAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC ACCGCGTCGGAAAAAGGTTACCACCACAGCAGGCTCGACCATTAACGCAACAAATGGCAAA 2821 2821 2881 2881 2941 2941 3121 3001 3001 3121 3061 3061 3181 3241 3361 3361 3661 3241 3301 3301 3421 3481 3481 3541 3601 3601 3421 3781 ò o ŏ qq  $\delta$ g ò qq δ QQ ŏ a δy g Db οy ò ρp δy qq ΟŊ Db Qγ D òγ pp QΩ Ω ò pp ò g q ò g ò

3900

```
4861 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAAGTATTTT 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4801 GTAGATTTCATCCTGCAATGAAGTCATTTTTTTTTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                          4501 AAATATTCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                                               4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500
                                                                                                                                                                                             4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                                                                                                                                                                                                                  4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACACAGTAAATGGGTTA 4440
                                                                                                       GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140
                                                                                                                                                   ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                                                                                                                             4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                                                                                                                                                          4261 GATATTAAAGCAACCAGCGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                        3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                       1021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080
3901 GITAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAATTGAAGCGAAATCGGGT 3960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4621
                                                                                                                                                              4081
                                                                                                                                                                                     4141
                                                                                                                                         1081
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            В
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ٥y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                Dp
                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                              q
                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                               ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                    pρ
                                                                                                                                                                                                                                                                                                                                                                                                                                                            οy
                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                      q
                                                                                                                                                                                                                                                                            ογ
                                                                                                              qq
                                                                                                                                                         Dp
                                                                                                                                                                                     Ω
                         Dp
                                               ò
                                                                   g
                                                                                           ò
                                                                                                                                       ολ
```

```
0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       The isolation and purification of the high molecular weight protein enables the identification of the major protective epitopes of the protein by conventional epitope mapping. These epitopes can then be synthesised using standard techniques and incorporated into fully synthetic or recombinant vaccines.
                                                                                                                                                                                                                                   /*tag= b
/note= "one of a gene cluster for High molecular"
weight protein 2"
7149..9098
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       97.8%; Score 4828.2; DB 14; Length 9323; 98.6%; Pred. No. 0; Live 0; Mismatches 68; Indels 0; G
                                                                                                                                                                                                                                                                                           /note= "One of a gene cluster for High molecular"
weight protein 2"
                                                                                                             HMW; high molecular weight protein; virus; vaccine; influenza; epitope; immunity; haemophilus influenzae; gene cluster; ss.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Sequence 9323 BP; 3133 A; 1829 C; 1833 G; 2528 T; 0 other;
                                                                                                                                                                                                            "High molecular weight protein 2"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   High molecular weight surface proteins – of non-typeable haemophilus which exhibit immunogenic properties
                                                                                        Gene cluster for high molecular weight protein 2 (HMW2).
                                                                                                                                                                                                                                                                                                                                                                                                                            (BARE/) BARENKAMP S J.
(INRM ) INSERM INST NAT SANTE & RECH MEDICALE.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             P-PSDB; AAR41728, AAR41729, AAR41730
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Claim 10; Figure 7; 100pp; English.
                                                                                                                                                                        Location/Qualifiers
                   AAQ49509 standard; DNA; 9323 BP
                                                                                                                                                                                                                                                                                                                                                                                                     92GB-0005704.
                                                                                                                                                                                                  /*tag= a
/product= "F
5375..7009
                                                                                                                                                                                                                                                                                                                                                                                93WO-US02166
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Best Local Similarity 98.6'
Matches 4869; Conservative
                                                                   26-APR-1994 (first entry)
                                                                                                                                                                                         . 5222
                                                                                                                                                   Haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      WPI; 1993-320683/40
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                16-MAR-1993;
                                                                                                                                                                                                                                                                                                                                                                                                        16-MAR-1992;
                                                                                                                                                                                                                                                                                                                                    WO9319090-A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Query Match
                                                                                                                                                                                                                                                                          CDS
                                                                                                                                                                                                                           CDS
RESULT 5
            AAQ49509
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           οy
                                                        ò
```

ö

TCTTTCATCTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT  [	AAATGATGAACCGAGGGAAGGGAGGGCGCAAGAATGAAGAGGGAGCTGAAC 30. 	AAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 36	GTCTCAAATTCAGCAAAGGCCTGAATGCTTTGGTTGCTGTGTGTG	IGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 48 	SCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 540 	TTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 60 	ATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660 	*ATCGACCAAAATGAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC 720 	GEGITACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780 	TCTTTTTAATCAACCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840 	GCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900 	GGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGTTTTAATT 960	GTRARGACGCCAGTGTAAATCTTATTGGTGGCAAAGTGAAAACGAGGGTGTG 1020 	AAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACCATCACCGAT 108 	CCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGGGGTCAATCTG 114	TTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA 1200 	TTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 126 
CTTTCATCTTTC 	CACATGAAATGAT( 	GAT     GAT	5115	rgac        Gac	GTT	CAATCTGTTTTAGC 	CAAGTAGATGGTAA 	() - ()	616 	CITI	CTTTAC 	8 = 8	ACTGTCGGTAAAGAC 	rn — rn	CCAAC	TTTGC	CTGCT
181	241	301	361	421	481	541	601 1041	661	721	781	841	901	961	1021 /	1081 1	1141 C	1201 G
Qy Dp	Oy Dp	Qy	Qy Db	Qy Db	Qy Db	QY Dp	Oy Db	Qy	Qy Dp	Qy Dp	Qy Db	Qy Db	QQ	Qy	Qy	Qy	Oy Dp

1261 AAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 1320 1701 AAAGAGGGTGAAGCGGGAAATTGCCGGTGTAATTCCGCTCAAAATCAGCAGAAGCTAAAGGC 1760 GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1380 2000 1620 2060 1680 2120 GATGTAACAATTGAAGCCGAAGACCCCCTTCGCAATAATACCGGTATAAATGAATTC 1740 2180 1741 CCAACAGGCACGGTGAAGCAAGCGACCCTAAAAAAATAGCGAACTCAAAACAACGCTA 1800 1860 1920 2300 2360 1980 2420 2040 2480 2100 GACGCGCCAAATGCTAAAATTGTCGCCCAGGGCACTGTAACCATTACAGGAGAGGGAAAA 2160 GATTICAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTTCA 2220 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280 2661 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAAACA 2720 2340 2341 AACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAATACATTCA 2400 1441 GGCATICAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC 1501 AAAGAAAAAGGGGGACGCGCTATTGTGGGGGGGGATATTGCGTTAATTGACGGCAATATT 2001 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGAGAAAATCGGGGCAT AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTTGTGGAGACATCGGGGGAT TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT ACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCATCA 1861 AGAAAACTTACCGTTAATAGCTCAA†CAACATCGGAAGCAACTCCCACTTAATTCTCCAT 1921 AGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATACTTCTAAAGGCGGA 1981 AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG GGTTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 2281 ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 1321 1381 1561 2061 1621 2121 1681 1801 2361 2041 2101 2161 2601 2221 2721 q ò qq qq ά Q q δ ad qq ŏ δ g ò qq ŏ Op δ Op Ω qq ŏ q q δ Q Db ò Ω ò QQ ò QQ qq ò

							0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0
2840	2460 2900	2520 2960	2580 3020	2640 3080	2700 3140	2760 3200	2820 3260	3320	294( 338(	3000	306( 350(	312( 356(	3181	324	330	336	342	348
	AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 	GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAA 	CCAAACGAGAACATGAACACAAGCATTAACCAATTCGGTTTTTAGCCAATATCACA	GCCACTGGTGGGGGCTCTGTTTTTTTGATATATATGCCAACCATTCTGCAGAGGGGCT 	GAGTTAAAAATGAGTGAAATTAATATCTCTAACGCGCTAATTTTACCTTAAATTCCCAT 	GTTCGCGGCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCA 	AATTTCAGCCTCAGACGAAAGATGATTTTTATGACGGTACGCACGC	AATTCAACCTACAACATATCCATTCTGGGCGGTA	TACTATCGAGAAAG                   TACTATCGAGAAAG	AATAACGCCCCTAATCAGCAAAACATAA 	GTTAATGGGAGTTT              GTTAATGGGAGTTT	TCAGAAAGCGCCACTTTTAAAGGAAAGA( 	ACCAATAATGGCACTGCCGAAAT	1 ACCAATGATGATGTAAACATTACCACTCACGCTAAACGCAACCAAGAAGAAGCATCATC	1 GGCGGAGATATAATCAACAAAAAGGAAGCTTAAATATTACAGACAG	1 GAAATCCAAATTGGGGGCAATATCTCGCAAAAAGAAGGCAACCTCAGGATTTCTTCCGAT 	AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGGGACTCTAGT 	1 TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA
2781	2401 2841	2461 2901	2521 2961	2581 3021	3081	2701 3141	2761 3201	2821 3261	2881 3321	2941 3381	3001	3061 3501	3121	3181	3241	330]	336]	342
QQ	Qy Db	QY	Qy	Qy	Qy	Qy	Qy Db	Oy Db	Qy	Qy	Qy	Qy Dp	Qy	Qy Db	Qy	Qy	Qy	Qy

4440 4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500 4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560 3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960 3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020 4401 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4460 4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080 4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140 4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAAACCACCGTGGCAGGCTCG 4260 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320 3781 ACCGCGTCGGAAAAGGTTACCACCACAGCTCGACCATTAACGCAACAAATGGCAAA 3840 3841 GCAAGTATTACAACCAAAAAGGTGATATCAGGGGTACGATTTCCGGTAACACGGTAAGT 3900 ATTACTGCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAAACAGTAAATATC 3780 3481 GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 3540 3541 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3600 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 3660 3661 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3720 3861 TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA 3920 4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4201 4261 3601 4101 3721 qq qq δ QY Db òγ Óγ Qγ qq QQ qq QΥ Pp  $^{\mathrm{pp}}$ QQ qq δ QQ Qy δ δy П òγ Db Qγ q QY Ω Qγ Óγ ŏλ

```
5120
GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620
                            4681 ACCAGACCGTCAAGTCAAGTGATATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                           GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                         4800
                                                                                                                                                                                                                                                                                                                                                                                                                             4801 GTAGATITCATCCIGCAAIGAAGICAITITAITITCGIATTAITIACIGIGIGGGITAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                            GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG
                                                                                                                                                                                                                                                                                                                                                    Non-typeable Haemophilus; high molecular weight surface protein; HMW2; hmw2 gene; immunogen; vaccine; otitis media; ss.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             High molecular weight proteins of non-typeable Haemophilus influenzae - useful for vaccine production
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Non-typeable Haemophilus influenzae hmw2 gene cluster.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Socation/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /*tag= a
/note= "hmw2 gene"
5375..709
/*tag= "ORF-b"
7249..9198
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Haemophilus influenzae strain 12.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     AAT90997 standard; DNA; 9323 BP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /*tag= c
/note= "ORF-c"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4921 AACAGGTTATTATTG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      5361 AACAGGTTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 97WO-US04707
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      96US-0617697
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                14-APR-1998 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (BARE/) BARENKAMP S J.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            WPI; 1997-503038/46.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        P-PSDB; AAW30294
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      W09736914-A1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    01-APR-1996;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 01-APR-1997;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           09-0CT-1997
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             AAT90997;
                                                                                                           4621
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     RESULT 6
AAT90997
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               CDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              CDS
                                               g
                                                                                                        à
                                                                                                                                                          Ω
                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                     ρp
                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ACCOS NO SET TO 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ŏ
```

```
This nucleic acid comprises a gene cluster for the hmw2 gene (see also AAT90995) that encodes high molecular weight surface protein HMW2 (see AAW30294) of non-typeable Haemophilus influenzae strain 12. In addition to the hmw2 gene there are 2 additional downstream open reading frames that are required for the correct processing and secretion of the hmw1 gene product. The ORF-b derived amino acid sequence demonstrates similarity with the derived amino acid sequences of 2 genes which encode proteins required for secretion sequences of 2 genes which encode proteins required for secretion HMW proteins (see AAW30291-94) can be used in vaccines, as immunogens for preparation of antibodies and as antigens for detection of
                                                                                                                                                                                                                                                                                                                                                 61 CACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                          121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1101 CAATTTAACATCGACCAAAATGAAATGTGCAGTTTTTACAAGAAAACAACAACTCGGC 1160
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          CACATGAAATGAAACGGAGGGAAGGGAGGGGCCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                0; Gaps
                                                                                                                                                                                                                                                                                                                               540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                561 AATGGTATAATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              181 CTITCATCTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            741 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           CGGGGTTGTGACCATTCCACAGAAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      CACTTAGCGTTAAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               661 CAATTTAACATCGACCAAAATGAAATGGAGTGCAGTTTTTACAAGAAAACAACTCCGCC
                                                                                                                                                                                                                                                                             Length 9323;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Sequence 9323 BP; 3135 A; 1829 C; 1831 G; 2528 T; 0 other;
                                                                                                                                                                                                                                                                                                        73; Indels
                                                                                                                                                                                                                                                                             DB 18;
                                                                                                                                                                                                                                                                       97.6%; Score 4820.2;
98.5%; Pred. No. 0;
tive 0; Mismatches
           Disclosure; Page 82-87; 183pp; English.
                                                                                                                                                                                                                                                                     Query Match
Best Local Similarity 98.5%
Matches 4864; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            621
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                481
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        601
ò
                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  a
                                                                                                                                                                                                                                                                                                                                                                                                                                                      ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ô
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Pρ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ó
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
```

ö

AAC 840     	AAT 900      AAT 1340	ATT 960      ATT 1400	srg 1020     grg 1460	GAT 1080      GAT 1520	TG 114	CAA 1200      	GCC 1260         	AGGC 1320       AGGC 1760	CTT 1380      CTT 1820	AAC 1440         	AGGC 1500       AGGC 1940	ATT 1560     ATT 2000	CAT 1620       CAT 2060	GAT 1680       GAT 2120	ATTC 1740        ATTC 2180	GCTA 1800       GCTA 2240	CATCA 1860         ATCA 2300
CTTTTTAATCAACCCAAAYGGTATCACAATAGGTAAAGACGCAATTATTA 	CTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGGGCGTP 	CGAGCAAACCAAAGATAAAGGGCTCGCTGAAATTGTGAATCACGGTTTAA 	TAAAGACGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGT 	AAATGGTGGCAGCATTTCTTTACTCGCAGGCAAAAAATCACCATCAGC 	CCCACCATTACTTACAGCATTGCCGCGCCTGAAATGAAGCGGTCAAT	TTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAAC 	TTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCC 	GTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAA 	GATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGAC 	AGAAGGGGGAGAAA 	ATTAGCAAAGAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATC 	AAAGGCGGACGCCTATTGTGTGGGCCGATATTGCGTTAATTGACGCAAT 	AAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGG 	CCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCTT 	PAATTGAAGCCGAAGACCCCTTCGCAATAATACGGTATAAATGATGA 	SCACCGGTGAAGCAAGCGACCCTAAAAAAATAGCGAACTCAAAAAACAAC 	AACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGG
GGACAAGT            GGACAAGT	ACTAATGG	TTCACCTT	TGT IGT	ATTAGCGT	AATAA 		GGTAAACT'           GGTAAACT'	AAAGAGGG	AAGC N N N N	CAGGT	GGCATTC           GGCATTC	AAAGAAA 	AACGCTC            AACGCTC	TATTTAT	GATGTAAG          GATGTAAG	CCAACAGG	CCAA
781 6	841 P	901 1	61	1021	081	141	1201 (	1261	32	m ao	1441	1501	1561	1621	1681	1741	ω ,
Qy	Qy Db	Qy	Qy	٥ م	r og	Qy Dp	Qy	Qy	Qy	QQ Dp	Qy	Qy	Qy	Qy	Qy	QY	δ d

1920 2360		4 8	0.4	9	2220	28	34	40 84	4 0	52	58	90	1,	2 2	∞ ~i	80 M	9 6	0
1861 AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT 	921 AGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA 	1981 AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 111111111111111111111111111111111111	4 8	0 4	9 0	(1 0	2281 ATTAACCAAACTACGAGAAAGAACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 	4 w	2401 AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 2. 	2461 GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAA 	2521 CCAAACGAGAACATGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 	2581 GCCACTGGTGGGGCTCTGTTTTTTTGATATATATGCCAACCATTCTGGCAGAGGGCT 	2641 GAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT	2701 GTTCGCGGCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAAATCA		2821 AATTCAACCTACAACATATCCATTCTGGGGGGTAATGTCACCCTTGGTGGAAAACTCA 	00 (	3321 AUCAGCAGCAGTAACGCAAAACATATAAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC
QY	Qy	Qy	QY	Oy Db	Qy Db	Qy Db	Qy Db	Qy	Qy	QY	Qy	QY	QY	QY Db	Qy Db	Qy Db	oy 2	ad Vy

3440	3060	3120 3560	3180 3620	3240 3680	3300 3740	3360	3420 3860	3480 3920	3540 3980	600	660 100	720 160	780 220	840 280	900 340	960	020 460	080
	01 GTTAATGGGAGTTTAAGTTTAAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT 	61 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACGGGAATTTT 	21 ACCAATAATGGCACTGCCGAAATTAATATAACACAAGGGGGGGG	81 ACCAATGATGGTGATTTAAACATTACCACTCAGGCTAAACGCAAACGAAAGAAGCATCATC 	41 GGCGGAGATATAATCAACAAAAAGGAAGCTTAAATATTACAGACAG	01 GAAATCCAAATTGGGGGAATATCTCGCAAAAAGAAGGGAGCTGCGGATTTCTTCGGAT	61 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGAGGACTCTAGT 	<ul> <li>21 TCAGATGCGACAAGTAATGCCAACCTAACTATAAAACCAAAGAATTGAAATTGACAGAA</li> <li>52 TCAGATGCGACAAGTAATGCCAACCTAACTATAAAACCAAAGAATTGAAATTGACAGAA</li> </ul>	AGCCAAAGATGGTAGAGATTTA 	41 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3 	01 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAAATGTGACACTAAATAGCAAAGTG 3 	61 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3 	21 ATTACTGCAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC 3 	81 ACCGCGTCGGAAAAGGTTACCACCACAGGAGGCTCGACCATTAACGCAACAAATGGCAAA 3	1 GCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAAGT 3	1 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3 	1 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4	1 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4
Db 33	Qy 30 Db 34	Qy 30 Db 35	Qy 31 Db 35	Qy 31 Db 36	Qy 32 Db 36	Oy 33 Db 37	Qy 33 Db 38	Qy 34 Db 38	Qy 34 Db 39	Qy 35. Db 391	Qy 360 Db 40	Qy 36( Db 41(	Qy 37; Db 416	Oy 378 Db 422	Qy 384 Db 428	Oy 390 Db 434	Qy 396 Db 440	Qy 402

```
DNA encoding Haemophilus influenzae strain 12 mature hmw2A, SEQ ID NO:72.
                                                             4461 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4520
                      GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140
                                 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                              4261 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGOTAAATGGT 4320
                                                                                                                 4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440
                                                                                                                                                                                                                                            4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500
                                                                                                                                                                                                                                                                                   GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                     5001 GAAAAAGTAAAAGTTTATCTGATGAAGAAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 5060
                                                                                                                                                                                                                                                                                                                                                                                                                                                      4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG
                                                                                                                                                                                                                                                                                                                 4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4741 GGGGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BP.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   AAA52198 standard; DNA; 3263
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        5361 AACAGGTTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            11-SEP-2000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        AAA52198;
                      4081
                                                                                  4581
                                                                                                      4201
                                                                                                                           4641
                                                                                                                                                                                                                                                                                                                                    4941
                                                                                                                                                                                                                                                                                                                                                                                                                     5061
                                                                                                                                                                                                                                                                                                                                                         4561
                                                                                                                                                                                                                                                                                                                                                                                                 4621
                                                                                                                                                                                                                                                                                                                                                                                                                                          4681
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4801
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              RESULT 7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         AAA52198
                      ò
                                       qq
                                                             ò
                                                                                 g
                                                                                                     ò
                                                                                                                        Db
                                                                                                                                              δ
                                                                                                                                                                 Db
                                                                                                                                                                                       ò
                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                            q
                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                         ŏ
                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                                                         δ
                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                    Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                        οχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                             pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  òλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ΔD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Dρ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Q
```

```
Mature HWM protein; hmw gene; hmwAl; hmwA2; high molecular weight; non-typeable Haemophilus influenzae; NTHi; non-encapsulated; recombinant production; Escherichia coli; antibacterial; vaccine; human disease; ottitis media; epiglottitis; pneumonia; tracheobronchitis; detection; diagnosis; ds.
                                                                                                                                                                                                                                                                                                                 Haemophilus influenzae strain 12.
```

/\*tag= a /product= "Haemophilus influenzae strain 12 mature HMW2A Location/Qualifiers 1675..4782 /\*tag= a mat\_peptide

protein"

WO200020609-A2.

13-APR-2000.

99WO-CA00938. 07-0CT-1999; 

98US-0206942. 98US-0167568 07-OCT-1998;

(CONN-) CONNAUGHT LAB LTD.

Loosmore SM, Yang Y, Klein MH;

WPI; 2000-303789/26. P-PSDB; AAB01849 Nucleic acid molecule for producing recombinant high molecular weight proteins of Haemophilus which are used as a vaccine to provide protection against Haemophilus induced diseases in humans .

## Claim 7; Fig 29E-N; 307pp; English.

The invention relates to the recombinant production of Haemophilus

Influenzae high molecular weight (HWM) proteins in Escherichia coli. The
expression construct used to effect recombinant expression comprises a
promoter functional in E. coli (e.g., the T7 promoter) operably linked

construct modified hamwabe operan from a non-typeable (non-encapsulated) H.

Influenzae (NTHI). Most HWW-expression NTHI strains contain two hamw gene
clusters termed humwabe. Each hamwabe operan comprises hamwa,
hamwab and hamw genes encode accessory proteins which are
and the hamwab and hamw genes encode accessory proteins which are
proteins. The modified brawabe operan used in the acpression construct of
proteins. The modified hamwabe operan used in the acpression construct of
the invention contains an A gene modified such that it encodes only the
mature HWMA. The invention also discloses hamway genes (AAASI198)

mature HWMA. The invention also discloses hamway genes and thaw
proteins (AAB01824-801849) from the non-typeable H. influenzae
strains Joyc, KI, KZI, LCDC2, PMHI, 15 and 12. The nucleic acids and
proteins which can be used as vaccines to mediate a humoral or
cell-mediated immune response to provide protection against diseases in
humans caused by H. influenzae (e.g., chitis media, epiglottitis,
humans caused by H. influenzae (e.g., chitis media, epiglottitis,
antigens in immunoassays for detecting antibodies against Haemophilus,
HWM proteins and/or HWW peptides. The nucleotide sequences encoding the
present sequence represents a modified NTHI huma gene encoding a mature
con-typeable strains of Haemophilus via hybridisation reactions. The
con-typeable strains of Haemophilus via hybridisation reactions and
con-typeable strains of Haemophilus via hybridisation reactions and
con-typeable strains of Haemophilus via hybridisation reactions and
con-typeable strains and object the proteins and contents a modified of the proteins and contents and content

Sequence 3263 BP; 1173 A; 628 C; 674 G; 788 T; 0 other;

```
;
0
                             Gaps
                           0;
 DB 21; Length 3263;
                             0; Indels
66.1%; Score 3263; D
ilarity 100.0%; Pred. No. 0;
Conservative 0; Mismatches
                 Similarity
                     Best Local Sim
Matches 3263;
      Ouery Match
```

1675 CCTGATGATGTAACAATTGAAGCCGAAGACCCCCTTCGCAATAATACCGGTATAAATGAT 1734 ò g

2815 GCCATCAATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAA 2874 2215 ATTICATCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAAT 2274 2395 ATTICAAGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTIT 2454 2515 TTAAAACCAAACGAGAACATGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAAT 2574 2635 GGGGCTGAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTÄCCTTAAAT 2694 2155 GGAAAAGATTTCAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATC 2214 2334 2335 CACTGGAACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAATAC 2394 GATCAGGGITTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAA 2094 1855 GCATCAAGAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATT 1914 1915 CTCCATAGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGAGAGATATTACTTCTAAA 1974 1975 GCCGGAAATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTT 2034 2095 GCACGCGACGCGGCAAATGCTAAAATTGTCGCCCAGGGCACTGTAACCATTACAGGAGAG 2154 11 CTCCATAGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAA 300 181 GCATCAAGAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATT 240 2035 qq Qγ g δλ qq οy Op QΥ qq οy QQ Op ōλ Op δ qq οy pp Оp δy qq ΩÝ δ q ÓΫ QQ ά g δ ΩD δy Ω

222]	3955	4015	2341	4075	2401	4135	2461	4195	2521	4255	2581	4315	2641	4375	2701	4435	2761	4495	2821	4555	2881	4615	2941	4675	3001	4735	3061	4795	3121	4855	3181	4915	3241	RESULT 8 AAQ49506
ΩD	Qy Db	Qγ	QQ	QY	QΩ	δλ	Ωp	Qy	Db	δλ	QΩ	δý	qq	οy	qq	οy	QQ	Οy	qq	QΫ	qq	δy	qq	Qy	QQ	δy	qq	Qy	qq	Qy	QQ	δy	QQ	RESU AAQ4
															<u>.</u>															_				
00	34	760	20 4	54	80	4	: 9	4	. 0	4	0	4	20	4	. 0	4	. 0	4	00	4	0	4	. 0	4	. 0	4	0	4		4				
12	(1)		7 -	30	13	31	7	m		33	ا اد 156	T 329	16	33	16	ď	174	347	18	A 353	186	359	192	365	198	371	204	377	210	383	216	38	22	3954
	FACGCTA	racec.	GGCAC	AATC	AATCI	ACCGC	ACCGG	CTTGG	CTTGG	AGAAG	AGAAG	AATAA	 AATAA	ATTTC	ATTTC	GAGGA	GAGGA	AAATT	AAATT	GGTAG.	11111 3GTAG	STAAC	STAAC	AATAG	AATAG	ACCGG	ACCGGG	CAGTA	CAGTA	CAAAT	CAAAT	ACACG		CGAAA
IIIII STIGG	AATGT	TOTAL	AAACTI	NAAGGG	NAAGGC	ATATO	ATATO	TAAA	TAAAA	ACCAA	ACCAA	ACAGT	ACAGT	TCACG	TCACG	ATGGA	ATGGA	AATTG	AATTG	AAGAT	AAGAT	AAACA	AAACAG	CACTA	CACTA	ACGAT!		CAAA	CAAA	CGCAA	CGCAP	CGGT	CGGTA	TGAAG
	CAGCA	TAGCA!	TATA	TATT	 TATT	CCTA	CCTAP	AGTGG	AGTGG	ACGCA	ACGCA	TACAG	TACAG	CAACC	CAACC	TATTG	TATTG	CAAAG	CAAAG	AGCCA	HIIII AGCCA	AGCCA	AGCCA	rgtga(		3GACA!	GACAZ	TCTCT	TCTCT	ATTA?	ATTA	ATTTC	ATTTC	AAAAT
TAATG	GAAAG	TAGAG	I I I I I	rgcag/		AGATAC		ACAAGG	CAAGG	GCTAA	GCTAA	AATAT	  AATAT	GAAGG	GAAGG	AAGGG	AAGGG	AAAAC	AAAAC	ATTAC	ATTAC	GCCGA	GCCGA	CACAA	CACAA	AATAG	AATAG	ATTAC	ATTACI	rcgacc	CGACC	SGTACE	GTACE	GCTCA
09299	ATCGA	AGGGA	AGGGA	GAAAA	  SAAA2	ACTAG2	ACTAG2	ATAAC!		ACTCAC	ACTCAC	GCTTA	GCTTA	AAAAA	AAAA	TCAAA	TCAAA	CTATT	CTATT	CAGAG	CAGAG	GCGGT	11111 GCGGT	ACGGT	ACGGT	AAAGC	 AAAGC	AAGAT	AAGAT!	CAGGC	CAGGC	rcagg	CAGC	AATCCC
	AACTCAAGCAGCAGCATTACGGGGAATATTACTATCGAGAAAAGCAGCAAATGTTACG 	ACATA	GAAGCCAATAAAGGCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAAACTTGGGAGC	CIGGC	THECTCGTTAATGGGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTC	GAAAG,		TTAAT		AATGTTACCAATGATGATGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAG	TTACC?	AAGGAA		CTCGC	GATGCTGAAATCCAAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGGTTTCT	'AACA		CCTA	TCTAGTTCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCCAAAGAATTGAAATTG	TAAAG		TAACA	GATTTAACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAACAGTAACT	TGCTG	TTTAACAATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAAATGTGACACTAAATAGC	ACGTG	AAAGTGAAAACATCTAGCAGCAGCAGGGGGGGGGGGAAAGCAATAGCGACAACGGC	AAACA		CACAG		TGATA		GTAAGTGTTAGCCCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAA 
ATCCA	GAATA	GCAAA	GCAAA	TTTAA	TTTAA	TAAAG	TAAAG	CGAAA	CGAAA	AAACA	AAACA	CAAAA	CAAAA	CAATAS	CAATA	ACAGAT	ACAGAT	rgcca4	GCCAP	TTCA	TTCA	GACGG	GACGG	ATCTC	ATCTC	ອອວອອ	99099	GAAGT	GAAGT	ACCAC	ACCAC	ACAGG	 ACAGG	TTAAC
HIII	ACGGG	AATCA	AATCA	TTAAG	TTAAG	ACTTT	ACTTT	ACTGC	ACTGC	GATTT,	SATT	ATCAA	ATCAA(	36066	99099	ACCAA	ACCAA	GTAAT	AGTAAT	CAGG	CAGGT	GTAAT	GTAAT	CAAAA	CAAAA	GCAAT	GCAAT	ATGTA	ATGTA	AGGTT	AGGTT	CCAAA	CCAAA	STGAT
IIIII	GCATT	LOCCE	CCCCT	GGAGT	GGAGT	ວວອວອ	20000	ATGGC	ATGGC	ATGGT	ATGGT	ATATA	ATATA	AAATT	AAATT	ATATC	TATC	GACA	GACA	TATT	TATE	CAACE	CAACA	AGATT	AGATT	TAGCA	TAGCA	AAAAA	AAAAA	GGAAA	GGAAA	TACAA	TACAA	GACTG
	CAGCZ CAGCZ	TAACG	TAACG	TAAT	TAATG	AGAAA	AGAAA	CAATA	CAATA	CAATG	CAATG	CGGAG	CGGAG	AATCC	AATCC	AATTA	AATTA	AGATG	AGATG	CTAAC	CTAAC	PATTG	ATTG	GTTA	GTTA	ACATO	ACATO	ACTGC	ACTGG	GCGTC	GCGTC	AGTAT	AGTAT	AGCGC
CATCA	TCAAC	GCCAA	GCCAA	CTCGT	CTCGT	ATTTC	ATTTC	TTTAC	TTTAC	GTTAC	GTTAC		ATCATCGG	GCTGA	GCTGA	GATAA	GATAA	AGTTC	AGTTC2	SAAGAC	SAAGAC	FTAACT	TAACT	ACAAT	ACAAT	TGAAA	TGAAA	CTATT	CTAT	TCACC	TCACC	AAGCA	AAGCA	GTGTT
-		2		5		Ŋ		ß		S		ß		Ŋ		ın		5 TCT		5 ACAG		5 GATT											- 0	GTAA
114	2875	293	1261	299	1321	305	1381	311	1441	317	1501	323	1561	329	1621	335	1681	3415	1741	3475	1801	3535	1861	3595	1921	3655	1981	3715	2041	3775	2101	3835	2161	3895
qa	oy D	Qy	qq	Qγ	qq	ογ	qq	οy	QQ .	οy	qq	Οy	Op	ΟŊ	QQ	Qy	QQ	Ωy	QQ	Οy	qq	Οy	ΩD	οy	qq	οy	qq	οy	qq	δy	QQ	Qy	QQ	δ,

```
2221 GTAAGTGTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAA 2280
                                          2460
                                                                                                                                                                                                       4194
                                                                                                                                                                                                              2580
                                                                                                                                                                                                                                                            4254
                                                                                                                                                                                                                                                                                                          4255 GGCTCGGATATTAAAGCAACCAGCGCACCTTGGTTATTAACGCAAAAGATGCTAAGGTA 4314
                                                                                                                                                                                                                                                                                                                          4374
                                                                                                                                                                                                                                                                                                                                                                                 2940
                                                                                                                                                                                                                                                                                                                                                                                                                             4434
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4435 GGGTTAAATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATT 4494
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4554
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4674
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      3060
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4735 GGTAATGGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATT 4794
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         GACAAGGTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTACTGTGTGG 4854
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  GTTAAAGTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGT 4914
                          3955 TCGGGTGAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAAT
                                                                                                                                      4075 GCGACAGAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGT
                                                                                                                                                        4135 TCTAGCATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCA
                                                                                                                                                                                                                                                                   GGAAGCATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCA
                                                                                                                                                                                                                                                                                                                                                                                                                      4375 AGTGTGACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAAT
                                                                                                                                                                                                                                                                                                                                                                 4315 AATGGTGATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4495 GAGGTGAAATATACCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4555 GTCCTTGAAAAAGTAAAAGATTTATCTGATGAAAAAGAGAAACATTAGCTAAACTTGGT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     4615 GTAAGTGCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4675 TTTACAACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 3241 ATTTTAACAGGTTATTATG 3263
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4915 ATTTTTAACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                     4195
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4795
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4855
```

```
160 TTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTC 219
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Qy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  рp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Dρ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Q
                                                                                                                                                      pp
                                                                                                                                                                                                                                 δy
                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                  Óγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   16;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 161 TITCAICTITCATCTITCATCTITCATCTITCATCTITCATCTITCATCTITCATCTITC 220
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         41 ATGACAAACAACTACAACACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAT 100
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               101 AGTATAAATCCGCCATATAAAATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATC 160
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            54.3%; Score 2680.2; DB 14; Length 5116; 73.5%; Pred. No. 0; trive 0; Mismatches 1093; Indels 265; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       The isolation and purification of the high molecular weight protein enables the identification of the major protective epitopes of the protein by conventional epitope mapping. These epitopes can then be synthesised using standard techniques and incorporated into fully
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                41 ATGACAAACAACAATTACAACACCTTTTTGCAGTCTATATGCAAATATTTT-AAAAAAT 99
                                                                                                                                                                                                                                                                                                       HMW; high molecular weight protein; virus; vaccine; influenza; epitope; immunity; haemophilus influenzae; ss.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /*tag= d
/transl_except= AAG encodes Asparagine.
misc_difference I674...1676
/*tag= e
/transl_except= CCG encodes Phenylalanine.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Sequence 5116 BP; 1766 A; 1008 C; 1037 G; 1305 T; 0 other;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /*tag= a //rag= n //rag= //rag
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties
                                                                                                                                                                                                                                 Sequence encoding high molecular weight protein 1 (HMW1).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /*tag= b
/transl_except= CTA encodes Isoleucine.
misc_difference 642..644
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /*tag= c
/transl_except= GAU encodes Alanine.
misc_difference 1437..1439
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (BARE/) BARENKAMP S J.
(INRM ) INSERM INST NAT SANTE & RECH MEDICALE.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  synthetic or recombinant vaccines.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Claim 3; Figure 1; 100pp; English.
        AAQ49506 standard; DNA; 5116 BP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             92GB-0005704.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  93WO-US02166
                                                                                                                                                          26-APR-1994 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Matches 3761; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ..4961
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             351..496
/*tag=
                                                                                                                                                                                                                                                                                                                                                                                                                              Haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             WPI; 1993-320683/40.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         P-PSDB; AAR41723
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      16-MAR-1993;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             16-MAR-1992;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     WO9319090-A.
                                                                                   AAQ49506;
```

ò Dp ò

ŏ Ω

```
1001 AAGTGAAAAACGAGGGTGTGATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGC 1060
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1121 AAAATGAAGCGGTCAATCTGGGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTG 1180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1181 CTGCCACTATTCGAAACCAAGGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCG 1240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1241 GCAATATTGTTCTTTCCGCCAAGGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTC 1300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      941 TIGIGAAICACGGITIAATIACIGICGCIAAAGACGGCAGIGIAAAICTIAIIGGIGGCA 1000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            701 AAGAAAACAACAACTCCGCCGTATTCAACCGTGTTACATCTAACCAAATCTGCCAATTAA 760
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 761 AAGGGATTTTAGATTCTAACGGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAG 820
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       821 GTAAAGACGCAATTATTAACACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACG 880
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                400 TTGCTGTGTCTGAATTGGCACGGGTTGTGACCATTCCACAGAAAAAGGCAGCAAAAAA 459
                                                                                                                                                                                                                              461 TTACTATCTTTAGGTGTAACCACTTAGGGTTAAAGCCACTTTCCGCTATGTTACTATCTT 520
               281 GAATGAAGAGGGAGCTGAACGAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCT 340
                                                                    341 TAGGAGAAAATATGAACAAGATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGG 400
                                                                                                                                                                       401 TIGCIGIGICTGAATIGGCACGGGGIIGIGACCAITCCACAGAAAAAGGCTICCGCIAIG 460
```

oy ob	1301	AAAATCAGCAAGCTAAAGGCGGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAA 1360 
Oy Db	1361	CAGGIGCAGTTATCGACCTTTCAGGTAAAGAGGGGGGGAGAAACTTACCTTGGCGGTGACG 1420 
Qy Db	1421	AGCGCGGCAAAGTAAAAACGGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCT 1480 
Qy Dp	1481	154
Qy Db	1541	r 160
Qy Db	1601	3 166   3 165
oy B	1661	172
Qy Db	1721	A 178
ζ G	1781 1780	AACGCCIGGA 184       AAAGGTACCT 183
Qy Db	1841	190
Qy Dp	1901	ACTCCCACTIAATICICCATAGIAAAGGICAGCGGGGGGGGGG
Qy Db	1961	200
Qý Dp	2009	TTGATGTTCATAAAAATATTACGCTTGATCAGGGTTTTTTAAATATTACGCCGCTTCG 2068 
Qy Dp	2069	TAGCTTTTGAAGGTGGAAATAACAAAGCACGCGACGCGCAAATGCTAAAATTGTCGCC 2128 
λ a a	2129	A 218
λα qo	2189	2 2
Sy Ob	2240 1	ACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACAATTAACCAAACTACGA 2296 
Z,	2297 (	A 235

```
2357 ATCT---AGAGACAGGCGCAAATTTTACCTTTATTAAATACATTTCAAGCAATAGCAAAG 2413
                                     2356 ATGTTTCCGAGAGGGGGAGTTTAACCTCACTATTGACTCCAGAGGAGGGATAGTGCAG 2415
                                                                                                       2414 GCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGCGTAAATGGCAACA 2473
                                                                                                                                                           2416 GCACACTTACCCAGCCTTATAATTTAAACGGTATATCATTCAACAAAGACACT---ACCT 2472
                                                                                                                                                                                                                    2474 TGTCATTCAATCTCAAAGAAGAGGGGAAAGTTAATTTCAAATTAAAACCAAACGAGAACA 2533
                                                                                                                                                                                                                                                                        2473 TTAATGTTGAACGAAATGCAAGAGTCAACTTTGACATCAAGGCACCAATAGGGATAAATA 2532
                                                                                                                                                                                                                                                                                                                           2534 TGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACAGCCACTGGTGGGG 2593
                                                                                                                                                                                                                                                                                                                                                                                  2533 AGTATTCTAGTTTGAATTACGCATCATTTAATGGAAACATTTCAGTTTCGGGAGGGGGGA 2592
                                                                                                                                                                                                                                                                                                                                                                                                                                      2594 GCTCTGTTT-----TTTTTGATATATATGCCAACCATTCTGGCAGGGGGCCTGAGTTAA 2647
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                2708 GCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCAAATTTCA 2767
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2713 CAAAAACTGGCTTCTCAATAGAGAAAGATTTAACTTTAAATGCCACC-----GGAGGCA 2766
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               2593 GIGTIGATITICACACTICICGCCTCATCCTCAACGTCCAAACCCCCGGTGTAGTAAA 2652
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   2648 AAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCATGTTCGCG 2707
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2767 ACATAACACTITIGCAAGTIGAAGGCACCGAIGGAAIGAITGGIAAAGGCAITGIAGCCA 2826
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2947 ITGACAACCATCAAAA----ACCITTAACIAITAAAAAAGATGICATCATTAATAGCG 3000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               2828 CCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCAAGCAGCA 2887
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   2888 GCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCCAATAACG 2947
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           3008 GCAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATTTCAGAAA 3067
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              3001 GCAACCTTACCGCTGGAGGCAATATTGTCAATATAGCCGGAAATCTTACCGTTGAAAGTA 3060
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                2948 CCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTCGTTAATG 3007
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  3068 GCGCCACTITIAAAGGAAAGACTAGAGAIACCCIAAATAICACCGGCAAITIIACCAAIA 3127
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         3061 ACGCTAATTTCAAAGCTATCACAAATTTCACTTTTAATGTAGGCGGCTTGTTTGACAACA 3120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                3121 AAGGCAATTCAAATATTTCCATTGCCAAAGGAGGGGCTCGCTTTAAAGACATTGATAATT 3180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            3181 CCAAGAATTTAAGGATCACCACCAACTCCAGCTCCACCTTACCGCACTATAAAGCGGCA 3240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  3128 ATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGCAATGTTACCAATG 3187
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            3188 AIGGIGATITAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATCGGCGGAG 3247
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       3248 ATATAATCAACAAAAAGGAAGCTTAAATATTACAGACAGTAATAATGATGCTGAAATCC 3307
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      3308 AAATTGGCGGCAATATCTCGCAAAAAGGAAGGCAACCTCACGATTCTTCCGATAAAATTA 3367
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  3301 AAATTGGCGGCGATGTCTCGCAAAAAGAAGGTAATCTCACGATTTCTTCTGACAAAATCA 3360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      3368 ATATCACCAAACAGATAACAATCAAAAGGGTATTGATGGAGAGAGTCTAGTTCAGATG 3427
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            3361 ATATTACCAAACAGATAACAATCAAGGCAGGTGTTGATGGGGGAGAATTCCGATTCAGACG 3420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   3428 CGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAAGACCTAA 3487
                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                   ōλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    염
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
```

۵	3421	
≱ a	488	GTATITCAGGITTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTAACTATTG 3547 
≱ q	548	AACA HILI AACA
λ. q	3608	aagattcaaaaatctctgctgacggtcacaatgtgacactaaatagcaaagtgaaaacat 3667 
≿ વ	3668	CTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACTATTACTG 3727 
≿ q	72	4 - A
λ.	78	- ; ;
g 2	3840	CALLANCOCAMCOCACOLOGICO CO.
. q	3838	Æ
λζ	3840	3839
QD	3898	CACTTACTGCAACCGAGGGCGCTCTTGCTGTAAGCAATATTTTCGGGCAACACCGTTACTG 3957
οy	3840	3839
Db	3958	TTACTGCAAATAGCGGTGCATTAACCACTTTGGCAGGCTCTACAATTAAAGGAACCGAGA 4017
δ	84	-AGCAAGTATTACAACCAAAACAGGTGATATCAGGGGTACGATTTCCGGTAACACGGTAA 3898
QQ .	0.0	GTGTAACCACTTCAAGTCAATCAGGGGATATCGGGGGTACGATTTCTGGTGGTGGGTG
Oy Dp	3899	GTGTTAGCGCAGCTGGTGATTTAACCACTAAAATCCGGCTCAAAAATVAGGCAAATCAG 595) 11   1   1   1   1   1   1   1   1   1
Qy Dp	3959	GT – S2
δ δ	01	TAAAT
3 6	07	CAGAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTAACTGAAGCCGGTTCTA 413
g 2	25	
QY	4139	GCATCACTICAACTAAGGGICAGGIAGACCTCTIGGCTCAGAAIGGTAGCATCGCAGGAA 4198 
ò	19	GCATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACGGTGGCAGG
- qq	4378	
δλ	4259	CGGAINTTAAAGCAACCAGCGCACCTTGGTTATTAACGCAAAAATGCTAAGCTAAATG 431:
qq	4438	CAAACATTAATGCAACCAGGGGTACCTTGGTTATTAACGCAAAAGACGCTGAGCTAAATG 449
οy	4319	9 GTGATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTG 4378

```
4859 AAGTTCAGTACGGGCTTTACCCCATCTTGTAAAAAATTACGGAGAATACAATAAAGTATTT 4918
                                                                                                                                                                                                                                                                                                                                                                           4679 CAACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTA 4738
                                                                                                                                                                                                                                                                                       4559 TTGAAAAAGTAAAAAGATTTATCTGATGAAGAAAGAGAAACAATAGCTAAAACTTGGTGTAA 4618
                                                                                                                                                                                        4619 GIGCIGTACGITIIGIIGAGCCAAAIAATACAAITACAGICAAIACACAAAAIGAAIITA 4678
                                                                                                                                                                                                     4739 ATGGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACA 4798
                   4379 TGACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGT 4438
                                                            4439 TAAATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGG 4498
                                                                          4499 TGAAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCC 4558
                                                                                                                   High molecular weight protein; HMW1; protective vaccine; otitis; sinusitis; bronchitis; Hib; ss.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Haemophilus high molecular weight protein HMW1 DNA sequence.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   AAQ72293 standard; DNA; 5116 BP.
                                                                                                                                                                                                                                                                                                                                                                                                                        5098 TTAACAGGTTATTATTATG 5116
                                                                                                                                                                                                                                                                                                                                                                                                            4919 TTAACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      94WO-US02550.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          93US-0038682.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Barenkamp SJ, St GEME JW;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             25-JUN-1995 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (BARE/) BARENKAMP S J. (SGEM/) ST GEME J W.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   WPI; 1994-316665/39.
P-PSDB; AAR63505.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           16-MAR-1993;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      15-MAR-1994;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Haemophilus.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           WO9421290-A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 29-SEP-1994.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         AAQ72293;
                                                                                                                                                                                                                                                                                                                                                                                                                                                               RESULT 9
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            OD
                                                                                                                                                                                                                                                                                                                           δλ
                                                                                                                                                                                                                                                                                                                                             QQ
                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                ò
                                                                                                                               pp
                                                                                                                                                    οy
                                                                                                                                                                       QΩ
                                                                                                                                                                                            Qγ
                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                     ŏλ
                                                                                                          ^{\circ}
```

```
41 ATGACAAACAACAATTACAACACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAAT 100
                                                                                       The HMAL Process an encoded by this sequence is useful in a vaccine to protect against disease caused by non-typeable Haemophilus which are not controlled by H. influenzae type b (Hib) vaccines. The encoded protein can also be used as a carrier for protective Hib polysaccharide (in a conjugate vaccin against meningitis) or for other antigens, haptens, etc. This DNA sequence is part of a larger sequence encoding a gene cluster for the hmwl gene (9011 bp).
                                                                                                                                                                                                                                                                                                                          101 AGTATAAATCCGCCATATAAAATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATC 160
                                                                                                                                                                                                                                                                                                                                                     100 AGTATAAATCGGCCATATAAAATGGTATAATCTTTCATCTTTCATCTTTCATCTTTCATC 159
                                                                                                                                                                                                                                                                                                                                                                                 ITICAICITICALCITICAICITICAICITICAICITITCAICITICAICITICAICITIC 220
                                                                                                                                                                                                                                                                                                                                                                                               340
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     400
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          460
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                640
                                                                                                                                                                                                                                                                                      580
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              579
                                                                                                                                                                                                                                                        Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   639
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            700
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   760
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             759
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   821 GTAAAGACGCAATTATTAACACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACG 880
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        GAATGAAGAGGGAGCTGAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       341 TAGGAGAAAATATGAACAAGATATATGGTCTCAAATTCAGCAAACGCCTGAATGCTTTGG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  401 TIGCIGIGICIGAAITGGCACGGGIIGIGACCAITCCACAGAAAAGGCIICCGCIAIG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           TAGGTGTAACATCTATTCCACAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              TTACTATCTTTAGGTGTAACCACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                TACACGGCACAGCCACTATGCAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ACGCTATCATTAATTGGAAACAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTAC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    AAGAAAACAACAACTCCGCCGTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              761 AAGGGATTTTAGATTCTAACGGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Ouery Match

54.3%; Score 2680.2; DB 15; Length 5116;
Best Local Similarity 73.5%; Pred. No. 0;
Matches 3761; Conservative 0; Mismatches 1093; Indels 265;
                                                                                                                                                                                                                                    Pred. No. 0;
0; Mismatches 1093; Indels 265;
                                                                                                                                                                                        Sequence 5116 BP; 1766 A; 1008 C; 1037 G; 1305 T; 0 other;
                                                                                The HMW1 protein encoded by this sequence is useful in a
                     non typeable
                               Haemophilus - useful in protective vaccines
                  of
                    proteins
                                                      Claim 2; Page 28; 127pp; English.
            New immunogenic high mol. wt.
                                                                                                                                                                                                                                                                                                                                                                                  161
                                                                                                                                                                                                                                                                                                                                                                                                                                       221
                                                                                                                                                                                                                                                                                                                                                                                                                                                               220
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           281
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      280
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             521
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        191
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       520
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                581
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            580
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       641
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               640
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          701
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    200
ò
                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                    à
                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        á
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ð
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
```

16;

```
941 TIGTGAATCACGGTTTAATTACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCA 1000
                                                                                                                                                           1059
                                                                                                                                                                                                         1119
                                                                                                                                                                                                                               1180
                                                                                                                                                                                                                                                                                  1180 CIGCCACTATICGAAACCAAGGTAAACTITCTGCTGATTCTGTAAGCAAAGATAAAAGGG 1239
                                                                                                                                                                                                                                                                                                                   1060
                                                                                                                                                                                                                                                                      1181 CTGCCACTATTCGAAACCAAGGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCG 1240
                                                                                                                                                                                                                                                                                                                                                                1301 AAAATCAGCAAGCTAAAAGGCGGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAA 1360
                                                                                                                                                                                                                                                                                                                                                                                                                     1420
                                                                                                                                                                                                                                                                                                                                                                                                                                           1419
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1479
                                 1540
                                             TTGTGGAGACATCGGGGCATTATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAG 1660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  AGTGGTTGCTAGACCCTGATGTAACAATTGAAGCCGAAGACCCCCTTCGCAATAATA 1720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1720 CTTCAGAAGACGATGAATACACGGGATCCGGGAATAGTGCCAGCACCAAAACGAAAAA 1779
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1781 GCGAACTCAAAACAACGCTAACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGA 1840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1837 ITGITAACAICACTGCTAAICAACGCAICIAIGICAAIAGCICCAITAAIII---AICCA 1893
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1901 ACTCCCACTTAATTCTCCCATAGTAAAGGTCAGGGTGGCGGAGGCGTTCAGATTGATGGAG 1960
         GTAAAGACGCAATTAATAACACTAATGGCTTTACGGCTTACGCTAGACATTTCTAACG
                                                                                             1000 AAGTGAAAAGAGGGTGTGATTAGGGTAAATGGTGGCAGCATTCTTTACTCGCAGGG
                                                                                                                                                                          1121 AAAATGAAGCGGTCAATCTGGGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTG
                                                                                                                                                                                                                                     1001 AAGTGAAAAACGAGGGTGTGATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGC
                                                                                                                                                                                       1300 AAAATCAGCAAGCTAAAGGCGGCAAGCTGATGATTACAGGCGATAAAGA
                                                                                                                                                                                                                                                                                                                                                                                                             1361 CAGGTGCAGTTATCGACCTTTCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACG
                                                                                                                                                                                                                                                                                                                                                                                                                                    1360 CAGGTGCAGTTATCGACCTTTCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACG
                                                                                                                                                                                                                                                                                                                                                                                                                                                           1421 AGCGCGGCGAAGGTAAAAACGGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1541 CGTTAATTGACGGCAATATTAACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1780 AAGAA---AAGACAACATTAACAAACACACTCTTGAGAGTATACTAAAAAAAGGTACCT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         820
                                                                                                                                                                                                                                               1120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1661
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1601
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1721
                                 ŏ
                                                       g
                                                                                                    QΩ
                                                                                δ
                                                                                                                             Ω
                                                                                                                                                   g
                                                                                                                                                                                                qq
                                                                                                                                                                           δ
                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                     δý
                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                  Qγ
                                                                                                                                                                                                                                                                                                                                                                                       a
                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δλ
```

qq òχ QQ à

QΩ

g

ò

qq ò

ŏ

qq	1894 ATG	ATGGCAGCTTAACTCTTTGGAGTGAGGGTCGGAGCGGTGGCGGTGGCGTTGACAACG	1903	
Oy Ob	1961 ATA     1954 ATA	ATATTACTTCTAAAGGCGGAAATTTAACCATTTATTCTGGCGGATGGC          ATATTACCACCGGTGATGATACCAGAGGTGCAAACTTAACAATTTACTCAGGCGGCTGGG	2008 2013	
λς Op	2009 TTG     2014 TTG	TTGATGTTCATAAAAATATTACGCTTGATCAGGGTTTTTTAAATATTACCGCCGCTTCCG 	2068 2073	
Qy Db	2069 TAG    2074 AAG	TAGCTTTTGAAGGGGGAATTAACAAAGCACGCGGCGAAATGCTAAAATTGTCGCCC	2128 2118	
oy Oy	2129 AGG     2119 AAG	agggcactgtaaccattacaggagagaggaaaggatttcagggctaacaacgtatctttaa 	2188 2175	
Qy Db	2189 ACG           2176 ACG	acggaacgggtaaaggtctgaatatcatttcatcagtgaataaTITTAACCC 	2239 2235	
Qy Db	2240 ACA       2236 ATA	ACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACAATTAACCAAACTACGA 	2296	
Qy Db	2297 GAP 11 2296 AAP	GAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGGAACGTCAGTGGTCTTA	2356 2355	
Qy Db	2357 ATCT      2356 ATGT	ATCTAGAGACAGGCGCAAATTTACCTTTATTAAATACATTTCAAGCAATAGCAAAG 	2413 2415	
Qy Db	2414 GCJ   1   2416 GCZ	GCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGCGTAAATGGCAACA	2473	
Qy Dp	2474 TG1   2473 TT	TGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAACCAACGAGAACA 	2533 2532	
Qy Db	2534 TG	TGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACAGCCACTGGTGGGG	2593 2592	
Qy	2594 GC	GCTCTGTTTTTTTTGATATATATGCCAACCATCTTGGCGAGGGGCTGAGTTAA	2647 2652	
Qy	2648 AA.   2653 AT	AAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCATGTTCGCG 	2707	
Qy	2708 GC 2713 CA	GCGATGACGTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCAAATTTCA 	2767 2766	
Qy Db	2768 GC 1 2767 AC	GCCTCAGACAGACGAAAGATGATTTTATGACGGGTACGCACGC	2827	
Q	2828 CC	CCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAAACTCAAGCAGA 	2887	
o y		GCATTACGGGAATATTACTATCGAGAAGCAGCAAATGTTACGCTAGAAGCCAATAACG 	2947	
oy o		CCCCTAATCACCACAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTCGTTAATG	3007	
QQ	2947 TT	TTGACAACCATCAAAAACCTTTAACTATTAAAAAAGATGTCATTAATAGCG	3000	

3788 C---GGAAAAGGTTACCACCACAGCAGGCTCGACCATTAACGCAACAAATGGCAA---- 3839 3778 CAAGTGGAGAAATTACCACTAAAACAGGTACAACCATTAACGCAACCACTGGTAACGTGG 3837 3838 AGATAACCGCTCAAACAGGTAGTATCCTAGGTGGAATTGAGTCCAGCTCTGGCTCTGTAA 3897 3898 CACTTACTGCAACCGAGGGCGCTCTTGCTGTAAGCAATATTTCGGGCAACACCGTTACTG 3957 3958 ITACIGCAAATAGCGGIGCAITAACCACTITGGCAGGCICTACAAITAAAGGAACCGAGA 4017 3361 ATATTACCAAACAGATAACAATCAAGGCAGGTGTTGATGGGGAGAATTCCGATTCAGACG 3420 3428 CGACAAGTAATGCCAACCTAATTAAAACCAAAGAATTGAAATTGACAGAAGACCTAA 3487 3488 GTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTAACTATTG 3547 3548 GCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAACAATGTTA 3607 3541 GTAACACCAATAGTGCTGA---TGGTACTAATGCCAAAAAAGTAACCTTTAACCAGGTTA 3597 3608 AAGATICAAAAATCICTGCIGACGGICACAAIGIGACACIAAATAGCAAAGIGAAAACAI 3667 3668 CTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACTATTACTG 3727 3728 CAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAAACAGTAAATATCACCGCGT 3787 1181 CCAAGAATTTAAGCATCACCAACTCCAGCTCCACTTACCGCACTATATAAGCGGCA 3240 3368 ATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGAGGAGAGGACTCTAGTTCAGATG 3427 3188 ATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATCGGCGGAG 3247 3248 AIAIAATCAACAAAAAAGGAAGCITAAATATTACAGACAGTAATAATGATGCTGAAATCC 3307 3061 ACGCTAATTTCAAAGCTATCACAAATTTCACTTTAATGTAGGCGGCTTGTTTGACAACA 3120 3121 AAGGCAATTCAAATATTTCCATTGCCAAAGGAGGGGCTCGCTTTAAAAGACATTGATAATT 3180 3008 GGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATTTCAGAAA 3067 3068 GCGCCACTTTAAAAGAAAAGACTAGAGATACCCTAAATATCACCGGCAATTTAACCAATA 3127 3128 ATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAAACTTGGCAATGTTACCAATG 3187 3840 ----qq QΥ Db Ωp ōλ Db δŏ Qγ δy qq ò οy QQ δy QΩ δ Д Dp δ Db Ω δ d δý Db Óγ g δy ŏ

```
3899 GTGTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGG 3958
                                                4018
                                                    4019 TAAATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGA 4078
                                                                                             4079 CAGAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTA 4138
                                                                                                                                       4139 GCATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAA 4198
                                                                                                                                                                                                          GCATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCT 4258
                                                                                                                                                                                                                                                  CGGATATTAAAGCAACCAGCGCACCTTGGTTATTAACGCAAAAGATGCTAAGGTAAATG 4318
                                                                                                                                                                               GTGATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTG 4378
                                                                                                                                                                                                                                                                                                       4379 TGACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGT 4438
                                                                                                                                                                                                                                                                                                                                                                             4439 TAAATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGG 4498
                                                                                                                                                                                                                                                                                                                                                                                        4499 TGAAATATCCAGCCAGGTGTAGAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCC 4558
                                                                                                                                                                                                                                                                                                                                                                                                                                  GTGCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTA 4678
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          CAACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTA 4738
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              4918
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  3959 GTGAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGG
                                                                                                                                                                                                                                                                                                                                              TTGAAAAAGTAAAAGATTTATCTGATGAAGAAGAGAAACATTAGCTAAACTTGGTGTAA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ATGGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ATGGCGCGACGGTGCGTTAATATCGCTGATAACGGCGCGTAGCGGTCAGTAATTGACA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               AGGTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          AAGTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             5098 TTAACAGGTTATTATTATG 5116
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  TTAACAGGTTATTATTATG 4937
                                                                                                                                                                                                                              4378
                                                                                                                                                                                                            4199
                                                                                                                                                                                                                                                   4259
                                                                                                                                                                                                                                                                                           4319
                                                                                                                                                                                                                                                                                                                                                                                                                                          4678
                                                                                                                                                                                                                                                                                                                                                                                                                                                              4559
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4738
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4619
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4798
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4679
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4858
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4739
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4918
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4978
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4859
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            5038
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4919
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4799
                                                           QΩ
                                        ò
                                                                                  ŏ
                                                                                                  qq
                                                                                                                       οy
                                                                                                                                             g
                                                                                                                                                                                   Ω
                                                                                                                                                                                                                            qq
                                                                                                                                                                  οŽ
                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                       q
                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                    δý
                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
```

```
Non-typeable Haemophilus; high molecular weight surface protein; HMW1; hmw1 gene; immunogen; vaccine; otitis media; ss.
                                           Non-typeable Haemophilus high mol.wt. surface protein hmwl gene.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /transl_except= (pos:360..362, aa:11e)
/transl_except= (pos:642..644, aa:Ala)
/transl_except= (pos:1437..1439, aa:Asn)
                                                                                               Location/Qualifiers
341..345
7*tag= a
129..135
/*tag= b
                                                                                                                                    /rpt_type= TANDEM
136..142
                                                                                                                                                        rpt_type= TANDEM
                                                                                 Haemophilus influenzae strain 12.
                                                                                                                                                                               /rpt_type= TANDEM
150..156
                                                                                                                                                                                                      'rpt_type= TANDEM
.57..163
                                                                                                                                                                                                                                                  TANDEM
                                                                                                                                                                                                                             TANDEM
                                                                                                                                                                                                                                                                         TANDEM
                                                                                                                                                                                                                                                                                               TANDEM
                                                                                                                                                                                                                                                                                                                    TANDEM
                                                                                                                                                                                                                                                                                                                                          TANDEM
                                                                                                                                                                                                                                                                                                                                                               /rpt_type= TANDEM
206..212
                                                                                                                                                                                                                                                                                                                                                                                                  /*tag= n
/rpt_type= TANDEM
220..226
                                                                                                                                                                                                                                                                                                                                                                                                                                                      /rpt_type= TANDEM
234..240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /rpt_type= TANDEM
351..4961
                                                                                                                                                                                                                                                                                                                                                                                       TANDEM
AAT90994 standard; DNA; 5116 BP.
                                                                                                                                                                                                                                                                                                            /*tag= j
/rpt_type= T
192..198
                                                                                                                                                                                                                                                                                             /rpt_type= 185..191
                              (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                         /*tag= o
/rpt_type= ?
227..233
                                                                                                                                                                                                                            /rpt_type=
164..170
                                                                                                                                                                                                                                                  /rpt_type=
171..177
                                                                                                                                                                                                                                                                        /rpt_type=
178..184
                                                                                                                                                                                                                                                                                                                                         /rpt_type=
199..205
                                                                                                                                                                         Ö
                                                                                                                                                                                                                                                                                                                                                                                     /rpt_type=
                                                                                                                                                    /*tag= c
                                                                                                                                                                                               Φ
                                                                                                                                                                                                                                            9
                                                                                                                                                                                                                                                                                                                                                                              /*tag= m
                                                                                                                                                                                                                                                                                                                                  /*tag= k
                                                                                                                                                                                                                                                                                                                                                                                                                                                /*tag= p
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      σ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /*tag≕ r
                                                                                                                                                                         /*tag=
                                                                                                                                                                                               /*tag=
                                                                                                                                                                                                                                           /*tag=
                                                                                                                                                                                                                                                                 /*tag=
                                                                                                                                                                                                                                                                                       /*tag=
                                                                                                                                                                                                                                                                                                                                                        /*tag=
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /*tag=
                                                                                                                                                                                                                     /*tag=
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                /*tag=
                              14-APR-1998
                                                                                                                     repeat_unit
                                                                                                                                                                repeat_unit
                                                                                                                                           repeat_unit
                                                                                                                                                                                      repeat_unit
                                                                                                                                                                                                            repeat_unit
                                                                                                                                                                                                                                   repeat_unit
                                                                                                                                                                                                                                                         repeat_unit
                                                                                                                                                                                                                                                                               repeat_unit
                                                                                                                                                                                                                                                                                                     repeat_unit
                                                                                                                                                                                                                                                                                                                                                repeat_unit
                                                                                                                                                                                                                                                                                                                           repeat_unit
                                                                                                                                                                                                                                                                                                                                                                      repeat_unit
                                                                                                                                                                                                                                                                                                                                                                                           repeat_unit
                                                                                                                                                                                                                                                                                                                                                                                                                  repeat_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                       repeat_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                             repeat_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        repeat_unit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   CDS
```

```
Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                        pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Óγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                           Dp
                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                     Db
                                                                                                                                                                                                                                                                                                                  Qγ
                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                           δλ
                                                                                    Db
                                                                                                                                   ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   281 GAATGAAGAGGAGCTGAACGAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCT 340
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   341 TAGGAGAAAATATGAACAAGATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGG 400
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  340 TAGGAGAAAATATGAACAAGCTATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGG 399
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             401 TTGCTGTGTCTCAATTGGCACGGGTTGTGACCATTCCACAGAAAAAGGCTTCCGCTATG 460
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          41 ATGACAAACAACAATTACAACACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAA 100
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    101 AGTATAAATCCGCCATATAAAATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATC 160
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           100 AGTATAAATCCGCCATATAAAATGGTATAATCTTTCATCTTTCATCTTTCATCTTTCATC 159
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              161 TTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTC 220
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                0; Mismatches 1093; Indels 265; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    41 ATGACAAACAATTACAACACCTTTTTTGCAGTCTATATGCAAATATTTT-AAAAAAT 99
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           This nucleic acid comprises the huwl gene of non-typeable
Haemophilus influenzae strain 12 that encodes high molecular
weight surface protein HWM1 (see AAW3029). A phage genomic
Library of strain 12 was screened for chones expressing high
C library of strain 12 was screened for chones expressing high
C strongly reactive clones were subcloned into T7 expression
C strongly reactive clones were subcloned into T7 expression
C strongly reactive clones were subcloned into T7 expression
C residue 442 of both full-length HWM1 and HWW2 gene products.
C correct processing requires the products of additional
downstream genes (see AAT90996 and AAT90997). Nucleotide sequences
( see AAT90922-93) encoding 2 HWW proteins of non-typeable H.
C The HWW proteins, conjugates and peptides can be used in
vaccines, as immunogens for preparation of antibodies and as
antigens for detection of these antibodies. The nucleic acid
probes for detection of related genes.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Nucleotide sequences
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  11arity 73.5%; Score 2680.2; DB 18; Length 5116; ilarity 73.5%; Pred. No. 0; Conservative 0; Mismatches 1093; Indels 265;
                                                                                                                                                                                                                                                                                                                                                                                      High molecular weight proteins of non-typeable Haemophilus influenzae - useful for vaccine production
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Sequence 5116 BP; 1766 A; 1009 C; 1036 G; 1305 T; 0 other;
                                                                                                                                                                                                                                                                                                                                                                                                                                                              Claim 6; Page 63-66; 183pp; English.
/rpt_type= INVERTED
                                                                                                                                                                                96US-0617697
                                                                                                                                      97WO-US04707
                                                                                                                                                                                                                                (BARE/) BARENKAMP S J.
                                                                                                                                                                                                                                                                                                                       WPI; 1997-503038/46.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Similarity
                                                                                                                                                                                                                                                                                                                                            P-PSDB; AAW30293
                                                                                                                                                                                                                                                                             Barenkamp SJ;
                                               WO9736914-A1
                                                                                                                                      01-APR-1997;
                                                                                                                                                                                   01-APR-1996;
                                                                                         09-OCT-1997
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Matches 3761;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Query Match
```

QΩ

pp

QQ

ò

QQ ò

Qγ

```
1480 CAACCATCAATGTATCAGGCAAAGAAAAAGGCGGACGCGCTATTGTGTGGGGGGATATTG 1539
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1421 AGCGCGGCGAAGGTAAAAACGGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCT 1480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1420 ACCCCGCCGAAGGTAAAAAGGCCATTCAATTAGCAAAGAAAACCTCTTAGAAAAAGGCT 1479
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1241 GCAATATTGTTCTTTCCGCCAAAGAGGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTC 1300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1301 AAAATCAGCAAGCTAAAGGCGGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAA 1360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1361 CAGGTGCAGTTATCGACCTTTCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACG 1420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1360 CAGGTGCAGTTATCGACCTTTCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACG 1419
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1001 AAGTGAAAAACGAGGGTGTGATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGC 1060
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1000 AAGTGAAAAACGAGGGTGTGATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGC 1059
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1121 AAAATGAAGCGGTCAATCTGGGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTG 1180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1181 CTGCCACTATTCGAAACCAAGGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCG 1240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        640
                                                                                                                                                                                                                                                                                                                                                                                                                                                           761 AAGGGATTTTAGATTCTAACGGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAG 820
                                    461 TTACTATCTTTAGGTGTAACCACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTT 520
                                                                                                                                         641 ACGCTATCATTAATTGGAAACAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTAC 700
                                                                                                                                                                                                                                                                                                                                                        701 AAGAAAACAACAACTCCGCCGTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAA 760
400 TTGCTGTGTCTGAATTGGCACGGGGTTGTGACCATTCCACAGAAAAAGGCAGCGAAAAAC 459
                                                         521 TAGGTGTAACATCTATTCCACAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAG
                                                                                                                                                                                                   581 TACACGGCACAGCCACTATGCAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTG
```

00	541	
	54	09
<u> </u>	601 TTGTGGAGACATCGGGGGATTATTTATCCATTGACAGGGAATGCAATTGTAAAACAAAAAG	1599
Ä		65
Ä i	61	
16	09	1719
17.	21 CCGGTATAAATGATGAATTCCCAACAGGCACCGGTGAAGCAAGC	1780
7	Æ	84
7	   AAAAAAGGTACCT	1836
18,	11 CAATGAATATAACGGCATCAAGAAACTTACCGTTAATAGCTCAATCAA	1900
7		96
18	1894 ATGGCAGCTTAACTCTTTGGAGTGAGGGTCGGAGCGGTGGCGGCGGCGTTGAGATTAACAACG	1953
15	961 ATATTACTTCTAAAGGCGGAAATTTAACCATTTATTCTGGCGGATGGG 2	2008
30		90
20	014 TIGATGITCATAAAAATATCTCACTGGGGGGGGCAAGGIAACATAAACAITACAGCTAAAC 2	:073
20	069 TAGCTTTTGAAGGTGGAAATAACAAAGCACGCGACGCGCAAATGCTAAAATTGTCGCCC 2	128
21	129 AGGGCACTGTAACCATTACAGGAGGGAAAGATTTCAGGGCTAACAACGTATCTTTAA 2 	2188
21	) A	23
22	40 ACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACAATTAACCAAACTACGA ATAAAATTATAACAACTAATATAACAATATAACAATATAACAATATAACAATATAAAATATAAAAATATAAAAATATAAAAATATAAAA	29
4 (	2 6	29
22 22	97 GAAAGACGCCTCGTATIGGCAAACCAGGCATGATICGCACTGGAACGTCAGTGCTCTTA 2	356 355
23	57 ATCTAGAGACAGGGGCAAATTTTACCTTTATTAAATACATTTCAAGCAATAGCAAAG 	41
24	14	415 473
24		47
24	74 TGTCATTCAATCTCAAAGAAGGAGGGAAAGTTAATTTCAAATTAAAACCAAACGAGAACA 2	533
S	34 IGAACACAAACCTITACCAATICGGITTITAGCCAATAICACAGCCACTGGIGGG 2	6
25.	2	592

2593 GIGITGAITTCACACITCTGCCCTCATCCTCTAACGTCCAAACCCCGGGGTGTATATAA 2652 ATTCTAAATACTTTAATGTTTCAACAGGGTCAAGTTTAAGATTTAAAACTTCAGGCTCAA 2712 2594 GCTCTGTTT-----TTTTTGATATATATGCCAACCATTCTGGCAGAGGGGCTGAGTTAA 2647 2648 AAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCATGTTCGCG 2707 2767 ACATAACACTTTTGCAAGTTGAAGGCACCGATGGAATGATTGGTAAAGGCATTGTAGCCA 2826 2828 CCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCAAGCAGCA 2887 2947 ITGACAACCATCAAAA----ACCITTAACTATTAAAAAAGATGTCATCATTAATAGCG 3000 3001 GCAACCTTACCGCTGGAGGCAATATTGTCAATATAGCCGGAAATCTTACCGTTGAAAGTA 3060 3307 ATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGCAATGTTACCAATG 3187 3121 AAGGCAATTCAAATTTTCCATTGCCAAAGGAGGGCCTCGCTTTAAAGACATTGATAATT 3180 3188 ATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATCGGCGGAG 3247 3487 3540 3607 3541 GTAACACCAATAGTGCTGA---TGGTACTAATGCCAAAAAAGTAACCTTTAACCAGGTTA 3597 3608 AAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTGAAAACAT 3667 3668 CTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACTATACTG 3727 2708 GCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCAAATTTCA 2888 GCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCCAATAACG GGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATTTCAGAAA GCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTTACCAATA CCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTCGTTAATG CGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAAGACCTAA AAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGATAAAATTA 3368 AIATCACCAAACAGATAACAATCAAAAGGGTATTGATGGAGGACTCTAGTTCAGATG CGACAAACAATGCCAATCTAACCATTAAAACCAAAGAATTGAAATTAACGCAAGACCTAA 3488 GTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTAACTATTG 3548 GCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAACAATGTTA 2768 3008 3128 3308 2948 3068 3428 3421 g δ Db Qγ qq δλ qq g qq ò Db qq δ á ò ò Dp δ g ŏ qq QQ ά δý pp Op qq ò óλ δ qq δy Dp δy g ó

```
4618 TAAATATCATTTCAAAAAACGGTATAAACACCGTACTGTTAAAAGGCGTTAAATGATG 4677
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4499 TGAAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGTAATTGAAGCGAAACGCGTCC 4558
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4678 TGAAATACATTCAACCGGGTATAGCAAGCGTAGATGAAGTAATTGAAGCGAAACGCATCC 4737
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4559 TTGAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAA 4618
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4379 TGACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAAACACAGTAAATGGGT 4438
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4439 TAAATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGG 4498
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              4438 CAAACATTAATGCAACCAGCGGTACCTTGGTTATTAACGCAAAAGACGCTGAGCTAAATG 4497
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              3899 GTGTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGG 3958
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4078 AGGTTAAAGCAACCGAAAGTTTAACCACTCAATCCAATTCAAAAATTAAAGCAACAACAACAG 4137
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     4079 CAGAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTA 4138
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     4258 CAGAAGGAGCTGCAACCTTAACTACATCGGGCAAATTAACTACCGAAGCTAGTTCAC 4317
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4139 GCATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAA 4198
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4318 ACATTACTTCAGCCAAGGGTCAGGTAAATCTTTCAGCTCAGGATGGTAGCGTTGCAGGAA 4377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4199 GCATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCT 4258
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4259 CGGATATTAAAGCAACCAGCGCCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATG 4318
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              4319 GTGATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTG 4378
                                                                                                                                                                                                                                                                                                                          3958 TTACTGCAAATAGCGGTGCATTAACCACTTTGGCAGGCTCTACAATTAAAGGAACCGAGA 4017
                                                                                                                                                                                                                                                                                                                                                                                            3840 -AGCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAA 3898
                                                                                                                                                                                                                                                                                                                                                                                                              3658 CCGGTAGTAATAACAACACTGAACATAGCAGTGACAATAATGCCGGCTTAACTATCGATG 3717
                                               3728 CAAAAARGTAGAAGTAAACAAAGATATFACTTCTCAAAACAGTAAATATCACCGCGT 3787
                                                                   3788 C---GGAAAAGGTTACCACCACAGGGTCGACCATTAACGCAACAAATGGCAA---- 3839
                                                                                                                                                                                                                       3838 AGATAACCGCTCAAACAGGTAGTATCCTAGGTGGAATTGAGTCCAGCTCTGGCTCTGTAA 3897
                                                                                                                                                                                                                                                                                           3898 CACTTACTGCAACCGAGGGCGCTCTTGCTGTAAGCAATATTTCGGGCAACACCGTTACTG 3957
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   П
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ōλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    οy
                                                                                                                                                                                                                                                                                                                                                                                                                           Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                           οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                οy
                                                                                   οp
                                                                                                                      ò
                                                                                                                                                    Db
                                                                                                                                                                                        ò
                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                         δ
                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                          pp
                                                                                                                                                                                                                                                                                                                                                                                      ολ
```

```
HMW protein; hmw gene; hmwAl; hmwA2; high molecular weight; mon-typeable Haemophilus influenzae; NTHi, non-encapsulated; recombinant production; Escherichia coli; antibacterial; vaccine; human disease; otitis media; epiglottitis; pneumonia; tracheobronchitis;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Nucleic acid molecule for producing recombinant high molecular weight proteins of Haemophilus which are used as a vaccine to provide protection against Haemophilus induced diseases in humans -
                                                                           4739 ATGGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACA 4798
                                                                                                                                                         4918 ATGGCGCGACGGTGTGCGTTAATATCGCTGATAACGGGCGGTAGCGGTCAGTAATTGACA 4977
                                                                                                                                                                                    4799 AGGTAGATITICATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTA 4858
                                                                                                                                                                                                4859 AAGTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAATTT 4918
                                                                                                                                                                                                                                                       4738 TIGAGAAGGTAAAAGATTTATCTGATGAAGAAAGAGAAGCGTTAGCTAAACTTGGAGTAA 4797
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /*tag= a
/product= "Haemophilus influenzae strain 12 HMWlA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                Haemophilus influenzae strain 12 hmw1A gene, SEQ ID NO:66.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Example 16; Fig 28A-Q; 307pp; English.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      protein"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Haemophilus influenzae strain 12.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Loosmore SM, Yang Y, Klein MH;
                                                                                                                                                                                                                                                                                                                                                                                       AAA52195 standard; DNA; 5116 BP
                                                                                                                                                                                                                                                                                              4919 TTAACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                        5098 TTAACAGGTTATTATTATG 5116
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   99WO-CA00938.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             98US-0167568
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       98US-0206942
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (CONN-) CONNAUGHT LAB LTD.
                                                                                                                                                                                                                                                                                                                                                                                                                                       11-SEP-2000 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           351..4961
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 detection; diagnosis; ds.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /*tag=
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       WPI; 2000-303789/26.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   P-PSDB; AAB01846.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                WO200020609-A2.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 07-OCT-1999;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             07-OCT-1998;
08-DEC-1998;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          13-APR-2000.
                                                                                                                                                                                                                                                                                                                                                                                                                 AAA52195;
                                                                                                                                                                                                                                                                                                                                                                                                                              Ω
                                                                                                                                                                                       δ
                                                                                                                                                                                                                g
                                                                                                                                                                                                                                           òγ
                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                              òχ
                                                                                                                                                                                                                                                                                                                      QQ
                                                                                 δλ
                                                                                                         q
                                                                                                                                   οy
```

The Invention relates to the recombinant production on heamuphilians influenzae high molecular weight (HMW) proteins in Escherichia coli, The Expression construct used to effect recombinant expression comprises a promoter functional in E. coli (e.g., the T7 promoter) operably linked to a modified himwabC operon from a non-typeable (mon-encappalated) H. Clusters termed himwabC operon from a non-typeable (mon-encappalated) H. Clusters termed himwabC and himwabC beck mawabC operon comprises himwabC clusters termed himwabC and himwabC operon comprises himwabC characters termed himwabC and himwabC operon used in the extreme himwabC proteins which are responsible for post-translational processing and secretion of the HMWA cproteins. The modified himwabC operon used in the expression construct of mature HMWA proteins an A gene modified such that it encodes only the contains an A gene modified such that it encodes only the mature HMWA proteins (AAB01824-D01849) from the non-typeable H. influenzae creations are used for the production of recombinant H. influenzae HMW proteins (AAB01849-B01849) from the non-typeable H. influenzae proteins which can be used as vaccines to mediate a humoral or estimated immune response to provide protection against diseases in preumonia and tracheobronchitis). The HMW proteins are also useful as thingment of the mature of the matu HMW proteins can be used to isolate and clone hmw genes from other non-typeable strains of Haemophilus via hybridisation reactions. The present sequence represents an hmwA gene from a non-typeable strain of H. invention relates to the recombinant production of Haemophilus

Sequence 5116 BP; 1766 A; 1008 C; 1037 G; 1305 T; 0 other;

54.3%; Score 2680.2; DB 21; Length 5116; 73.5%; Pred. No. 0; tive 0; Mismatches 1093; Indels 265; Gaps 41 ATGACAAACAACAATTACAACACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAAT 100 161 ITTCATCTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTC 220 101 AGTATAAATCCGCCATATAAAATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATC 160 281 GAATGAAGAGGGAGCTGAACGAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCT 340 280 GAATGAAGAGGGAGCTGAACGAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCT 339 341 TAGGAGAAAATATGAACAAGATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGG 400 401 TTGCTGTGTCTGAATTGGCACGGGGTTGTGACCATTCCACAGAAAAAGGCTTCCGCTATG 460 461 TTACTATCTTTAGGTGTAACCACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTT 520 400 TIGCIGIGICIGAATIGGCACGGGCTIGIGACCATICCACAGAAAAAGGCAGCGAAAAAC 459 521 TAGGTGTAACATCTATTCCACAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAG 580 581 TACACGGCACAGCCACTATGCAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTG 640 41 ATGACAAACAACAATTACAACACCTTTTTTGCAGTCTATATGCAAATATTTT-AAAAAAT 99 460 CIGCICGCAIGAAAGIGCGICACIIAAGCGIIAAAGCCACIIICCGCIAIGIIAACIAICII Matches 3761; Conservative Similarity Query Match рр qq ó ò g õ g δ qq ò Dp à q ò g

941 TTGTGAATCACGGTTTAATTACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCA 1000 1001 AAGTGAAAAACGAGGGTGTGATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGC 1060 1060 AAAAAATCACCATCACCATATAATAAACCCAACCATTACTTACAGCATTGCCGCCCTG 1119 1121 AAAATGAAGCGGTCAATCTGGGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTG 1180 1181 CTGCCACTATTCGAAACCAAGGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCG 1240 1241 GCAATATTGTTCTTTCCGCCAAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTC 1300 641 ACGCTATCATTAATTGGAAACAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTAC 700 1301 AAAATCAGCAAGCTAAAGGCGGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAA 1360 1361 CAGGTGCAGTTATCGACCTTTCAGGTAAAGAAGGGGGGAGAAACTTACCTTGGGGGGTGACG 1420 1421 AGCGCGGCGAAGGTAAAAACGGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCT 1480 1481 CAACCATCAATGTATCAGGCAAAGAAAAAGGCGGACGCGCTATTGTGTGGGGGCGATATTG 1540 701 AAGAAAACAACTCCGCCGTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAA 760 761 AAGGGATTTTAGATTCTAACGGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAG 820 821 GTAAAGACGCAATTATTAACACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACG 880 1420 AGGGGGGGAAGGTAAAAAGGGCATTCAATTAGCAAAGAAAAAACCTCTTTAGAAAAAAGGCT 1479 1480 CAACCATCAATGTATCAGGCAAAAAAAGGGGGACGCGCTATTGTGTGGGGGGATATTG 1539 1541 CGTTAATTGACGGCAATATTAACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTT 1600 1601 TTGTGGAGACATCGGGGCATTATTATCCATTGACAGCAATGCAATTGTTAAAACAAAG 1660 1600 TTGTGGAGACGTCGGGGGATGATTATTCATCAAAGACAATGCAATGTTGTTGAAGA 1659 1661 AGTGGTTGCTAGACCCTGATGATGTAACAATTGAAGCCGAAGACCCCCTTCGCAATAATA 1720 1660 AGTGGTTGTTAGACCCGGGTAATGTATCTATTAATGCAGAAAACAGCAGGACGCAGCAATA 1719 a δ q ò Q ò qq δy qq ò g ò qq ò g ò g ò g qq δ á qq δ О δλ q à g οy g qq õ á qq

79	01	33	50	98	58	8 81	38	39	96	56 55	13 15	73	33	93	47	07	67	27
17	A 1840	A 1900 A 1893	3 1960 3 1953	\$ 2008 \$ 2013	3 2068	212	A 218	223	A 229	23	24	A 247 I 247	A 25	25	A 264'     265:	3 270°	27	A 282
AAACA	TEGA FACCT	AAGCA I ATCCA	rggac   	ATGGG 	rtcc(       AAA(	SGCCC    -  AGGTC	FTTAA           FCTAA	AACCC	TACGA       ACCTA	TCTTZ   CTTAZ	CAAA(     TGCA(	CAACA     -ACCT	GAAC. 	TGGG(	GTTA    TATA	TCGC	CAAATTTCA    GGAGGCA	TTCA.
I I AACG	ACGC(       AAGG	TCGG/    /	TTGA       TTAA	990999	CCGC	AATTGTCGCCC          -ATTACAGGTC	TATC      TCTC	-TTT.     CTAT	AAAC: TTTI,	GTGC	ATAG 	ATGG      CT	ACGA	CTGG 	CTGA   TAGT	ATGT   CAGG	CAAA	TCAA 
    CCAA	AAAA       AAAA	AACA     AATT	CAGA III GAGA	TCTG 	ACCG   ATTA	TAAAA   	AACG       AATG	TACG	-TAACCAAACTACGA 	GTCA     TTAA	AGCA       AGCG	GTAA      GACA	CCAA   ATAG	GCCA    TCGG	6666 	TCCC	AATT	GCCAT
	TCTG 	AATC 	CGTT	ATTTAT       ATTTAC	TATT    AAAC	ATGCT	TAAC 	Y		ACTGGAAC          ACTGGAAT	rttca    SAGGA	ACGGC II	FAAAA 	CACA	SCAGA    - 	FAAAT      FTAAA	CAACC	SCAATGC
II II	AATTA     AGTA]	AATAGCTC             AATAGCTC	3GAGG	ACCAT	FTAAZ      AACAJ	SCAA	AGGGC       AGAT1	AATAA   	ACAAT   	CACT	TACA: TCCA(	TTTA	AAAT:       -	AATA:     ATTTC	TCTG	ACCT.     AGAT.	raaatge        raaatge	GCAC
 TAGT(	TTCA   TGAG	TAAT	TGGC(  -  CGGT(	TTTAAC        CTTAAC	TTTT	2	TTTC.       TTT	AGTG   AAGA	TATA	TTCG    CACT	TAAA     TGAC	GAAT	CATC	AGCC      AAAC	CCAT	TTTT 	CATA	GTAC
	GCGAACTCAAAACGATAACCAATACAACTATTCAAATTATCTGAAAAACGCCTGGA 	CAATGAATATAACGGCATCAAGAAAACTTACGGTTAATAGCTCAATCAA	ACTCCCACTTAATTCTCCATAGTAAAGGTCAGCGTGCGGGGGGGG	ATATTACTTCTAAAGGCGGAAATTTAACCATTTATTCTGGCGGATGGG          ATATTACCACCGGTGATGATACCAGAGGTGCAAACTTAACAATTTACTCAGGCGGCTGGG	TTGATGTTCATAAAAATATTACGCTTGATCAGGGTTTTTAAATATTACGGCGGCTTCCG 	TAGCTTTTGAAGGTGGAATAACAAAGCACGCGACGCGGCAAATGCCTAAAATTGTCGCCC 	agggcactgtaaccattacagagagagaaagatttcagggctaacaacgtatctttaa 	acggaàcgggtaaaggtctgaatatcatttcatcagtgaataatttaaccc 	ACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACAATTAACCAAACTACGA 	GAAAGAACCTCGTATTGGCAAACCAGCCATGATTCGCACTGGAACGTCAGTGCTCTTA 	ATCTAGAGACGCGCAAATTTTACCTTTATTAAATACATTTCAAGCAATAGCAAAG 	GCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGCGTAAATGGCAACA 	tgtcattcaatctcaabgaaggaggaagttaatttcaaattaaaccaaacgagaaca 	TGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACAGCGCTGGTGGGG 	GCTCTGTTTTTTTTGATATATGCCAACCATTCTGGCAGGGGCTGAGTTAA 	AAATGAGTGAAATTAATATCTCTAACGGGGGTAATTTTACCTTAAATTCCCATGTTCGG 	GCGATGACGTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCAAATTTCA 	GCCTCAGACAGACGAAAGATGATTTTATGACGGGTACGCACGC
	PACAP 	ACTTA      ATCT	AGGTC 	AGGCC AGGTC	PGATC           	AGCAC	SGGAA 	TCATT1      TCACCA	ATCTO 11 I	CAGCC II	racci    cerca	rgcac     	SAAAC 11 SAAC	rcgg1	ATATO 	GGGCC       AGGGT	AGAC:        - -	TTAT
- - - - -	CCAAC	GAAAA   	GTAAA         GTGA(	CTAA     CCAG	CGCTC	ACAAA      GAAG	GAGA(	ATATO     AATTO	ACAT	AAACO       AATTO	ATTT   TTAA	GCTC'   ATTT	GAGC         GAGT	CAAT 	ATAT	CTAA       CAAC	ACAA   11 AGAA	ATTT 
 TACA	CTAA        TAA	TCAA	CATA   TGGA	TT      GATA	ATTA        ATCT	AATA       AAAG	ACAGG       TCAGG	CTGA    -	ATTA     TTAA	TGGC	GCAA    GAGT	AGAA   TATA	GAAG      GCAA	TTAC	TTTG	ATCT	ATCA       ATAG	AAGATGA 
GATGAAT	AACG	GGCA	TCTC	TGAT	TGATGTTCATAAAAATAT                 TGATGTTCATAAAAATAT	TGGA       TGAG	ACCATT   ACC	AAGGT    SCGGA	SCACA 	GTAT	AGGC 	AGTAT	CCAAA 	AACCI    GAAI	ACTI	FTAAT             TAAT	TTAAP 	GAAA   11
I II	AAAAC          \AGAC	ATAAC	rtaat        TAAC	ATATTAC	SATAP 	SAAGG	STAAC 	SGTAA	AGTGC      SAAGC	ACCTC AGTGC	SAGAC IIII SAGAC	ACACA 	AATCI     SAACC	AGCA!	r rrcac	SAAA:       TACT:	SCTT	CAGA(
- AGAAC	ACTC!	3AATA     TAACA	CCACT	PAC-:        ACC!	rgrrc 	TTTT     FATC	CACTC	AÁCGO   1   CACTO	TCTT/     ATTT	GAAC.   TGAA.	AC	AACA.       ACTT	ATTCA   TGTT(	CACA	GCTCTGTTT           GTGTTGATTTCA	GAGT   TAAA	TGAC	CAGAC
- CTTC	GCGA.	CAAT	ACTC   ATGG	ATAT       ATAT	TTGA'      TTGA'	TAGC 	AGGG         AAGG	ACGG             ACGG	ACAA         ATAA	GAAA     AAAA	ATCT-      ATGTT	GCTT          	TGTC   TTAA	TGAA     AGTA	GCTC   GTGT	AAAT   ATTC	GCGA       CAAA	GCCT 
1720	1781	1841	1901	1961	2009	2069	2129	2189	2240	2297	2357	2414	2474	2534	2594 2593	2648	2708	2768
qq	Qy Db	Qy	Qy Db	Qy Db	Qy Db	Qy	Qy Dp	Qy	Qy Db	Qy	QY Dp	QY Dp	Qy	Oy Dp	Qy	Qy Db	Qy Db	δλ

3658 CCGGTACTAATAACAACACTGAAGATAGCAGTGACAATAATGCCGGCTTAACTATCGATG 3717 3788 C---GGAAAAGGTTACCACCACCAGCAGGCTCGACCATTAACGCAACAAATGGCAA----- 3839 3181 CCAAGAATTTAAGCATCACCACCAACTCCAGCTCCACTTACCGCACTATTATAAGCGGCA 3240 3598 AAGATTCAAAAATCTCTGCTGACGGTCACAAGGTGACACTACACAGCAAAGTGGAAACAT 3657 3668 CTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACTATTACTG 3727 3728 CAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATCACGCGGT 3787 3838 AGATAACCGCTCAAACAGGTAGTATCCTAGGTGGAATTGAGTCCAGCTCTGGCTCTGTAA 3897 3188 ATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAAGGCATCATCGGCGGAG 3247 3308 AAATTGGGGGGAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGATAAAATTA 3367 3368 ATATCACCAAACAGATAACAATCAAAAAAGGGTATTGATGGAGGAGGACTCTAGTTCAGATG 3427 3428 CGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAAGACCTAA 3487 3488 GTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTAACTATTG 3547 3548 GCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAACAATGTTA 3607 3608 AAGATTCAAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTGAAAACAT 3667 3778 CAAGTGGAGAAATTACCACTAAAACAGGTACAACCATTAACGCAACCACTGGTAACGTGG 3837 2767 ACATAACACTITTGCAAGTIGAAGGCACCGAIGGAATGATTGGTAAAGGCATTGIAGCCA 2826 2828 CCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCAAGCAGCA 2887 2888 GCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCCAATAAACG 2947 2948 CCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTCGTTAATG 3007 2947 TTGACAACCATCAAAA-----ACCTTTAACTATTAAAAAAGATGTCATCATTAATAGGG 3000 3008 GGAGTTTAAGTTTAACTGGGGAAAATGCAGATATTAAAGGCAATCTCACTATTTCAGAAA 3067 3001 GCAACCTTACCGCTGGAGGCAATATTGTCAATATAGCCGGAAATCTTACCGTTGAAAGTA 3060 3068 GCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTTACCAATA 3127 3061 ACGCTAATTTCAAAGCTATCACAAATTTCACTTTTAATGTAGGCGGCTTGTTTGACAACA 3120 3128 ATGGCACTGCCGAAATTAATAACACAAGGAGTGGTAAAAACTTGGCAATGTTÄCCAATG 3187 qq Dp QQ qq Ω qq qq qq g d Qγ g φ ŏλ qq δλ Пр οy Ωp οy Ω ò qq οy QΥ ŏ οy ò Qγ Qγ δ δy Ω

4799 AGGTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTACTGTGTGGGGTTA 4858

ŏ

Qy	3840		3839	
q	3898	CACTTACTGCAACCGAGGGGGCGTCTTGCTGTAAGCAATATTTCGGGCAACACGTTACTG	3957	
Qγ	3840		3839	
qq	3958	TTACTGCAAATAGCGGTGCATTAACCACTTTGGCAGGCTCTACAATTAAAGGAACCGAGA	4017	
Qy Db	3840	-AGCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAA 	3898 4077	
δy	3899	GTGTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGGGAAATCGG	3958	
Dp	4078	AGGITAAAGCAACCGAAAGTITAACCACTCAATCCAATTCAAAAATTAAAGCAACAACAACAACAACAACAACAACAACAACAACAA	4137	
Qy Dp	3959	GTGAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGG	4018	
Qy Db	4019		4078	
οy	4079		13	
qq	4258	CAGAAGGAGCTGCAACCTTAACTACATCATCGGGCAAATTAACTACCGAAGCTAGTTCAC	4317	
QY Dp	4139	GCATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAA 4	4198	
QY	4199		4258	
qq	4378	GTATTAATGCCGCCAATGTGACATAATACTACAGGCACTTTAACTACCGTGAAGGGTT 4	437	
Oy Db	4259	CGGATATTAAAGCAACCAGCGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATG 4	4318	
ōλ	4319		3	
QQ	4498	rggtaaccacacagrgtaaargcaaccaacgcaaar	557	
Oy Dp	4379	TGACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGT 4 	4438	
Qy Dp	4439	TAAATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGAAATTGAGG 4	4498	
δλ		1 4	55	
QQ	4678		4737	
Qy Db	4559	ITGAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAA 4 	4618	
Οy	4619 (		4678	
qq	4798 (		857	
Oy Dp	4679 (	CAACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTA 47. 	4738	
Q <sub>y</sub>	4739 <i>t</i> 4918 <i>t</i>	ATGGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACA 47) 	4798 4977	

```
4978 AGGTAGATTTCATCCTCCAATGAAGTCATTTATATTTTCGTATTATTACTGTGGGGTTA 5037
                                     4859 AAGTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTT 4918
                                                     5038 AAGTICAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTT 5097
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      The isolation and purification of the high molecular weight protein enables the identification of the major protective epitopes of the protein by conventional epitope mapping. These epitopes can then be synthesised using standard techniques and incorporated into fully synthetic or recombinant vaccines.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /*tag= c /*tag= c /*tag= c /*note= "One of a gene cluster for high molecular weight protein 1"
                                                                                                                                                                                                                                                                                                                                                                                                                                                           /notes "One of a gene cluster for high molecular weight protein 1"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /note= "Possible error in sequence. Alternative sequence for this region is CTTAAATGTT TCCGAGAGTG GCGAGTTTAAA (See AAR41725)"
                                                                                                                                                                                                                                                                                                      HMW; high molecular weight protein; virus; vaccine; influenza; epitope; immunity; haemophilus influenzae; gene cluster; ss.
                                                                                                                                                                                                                                                                                                                                                                                                                     /product= High molecular weight protein 1.
                                                                                                                                                                                                                                                                          Gene cluster for high molecular weight protein 1 (HMW1).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     (INRM ) INSERM INST NAT SANTE & RECH MEDICALE.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           P-PSDB; AAR41725, AAR41726, AAR41727.
                                                                                                                                                                                                                                                                                                                                                                              Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Claim 9; Figure 6; 100pp; English.
                                                                                                                                                                                           AAQ49508 standard; DNA; 9220 BP.
                                                                                                            5098 TTAACAGGTTATTATTATG 5116
                                                                                             4919 TTAACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  93WO-US02166.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               92GB-0005704.
                                                                                                                                                                                                                                                                                                                                                                                                                                    5114. 6748
                                                                                                                                                                                                                                                 26-APR-1994 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        7062..9011
                                                                                                                                                                                                                                                                                                                                                                                             ..4958
                                                                                                                                                                                                                                                                                                                                                  Haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                          /*tag=
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (BARE/) BARENKAMP S J.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           WPI; 1993-320683/40.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  16-MAR-1993;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             16-MAR-1992;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           WO9319090-A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      30-SEP-1993.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                repeat_unit
                                                                                                                                                                                                                       AAQ49508;
                                                                                                                                                                  RESULT 12
                                                                                                                                                                                                                                                                                                                                                                                                                                    CDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        CDS
                                                                                                                                                                               AAQ49508
          g
                                                                                             οy
```

1361 CAGGIGCAGTTATCGACCTTTCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACG 1420 1000 AAGTGAAAAACGAGGGTGTGATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGC 1059 1121 AAAATGAAGCGGTCAATCTGGGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTG 1180 1181 CTGCCACTATTCGAAACCAAGGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCG 1240 1241 GCAATATTGTTTTTCCGCCAAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTC 1300 1301 AAAATCAGCAAGCTAAAGGCGGCAAGCTGATGATTACAGGCGGATAAAGTCACATTAAAAA 1360 1360 CAGGTGCAGTTATCGACCTTTCAGGTAAAGAAGGGGGAGAACTTACCTTGGCGGTGACG 1419 1421 AGCGCGCCGAAGGTAAAAACGGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCT 1480 1541 CGTTAATTGACGGCAATATTAACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTT 1600 1601 TTGTGGAGACATCGGGGCATTATTATCCATTGACAGCAATGCAATTGTTAAAACAAAAG 1660 1600 TTGTGGAGACGTCGGGGCATGATTTATTCATCAAAGACAATGCAATTGTTGACGCCAAAG 1659 1661 AGTGGTTGCTAGACCCTGATGATGTAACAATTGAAGCCGGAAGACCCCCTTCGCAATAATA 1720 1721 CCGGTATAAATGATGAATTCCCAACAGGCACCGGTGAAGCGAAGCGACCCTAAAAAATA 1780 1720 CTTCAGAAGACGATGAATACACGGGATCCGGGAATAGTGCCAGCACCCCAAAACGAAACA 1779 1781 GCGAACTCAAAACAACGCTAACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGA 1840 1837 TTGTTAACATCACTGCTAATCAACGCATCTATGTCAATAGCTCCATTAATTT---ATCCA 1893 1901 ACTCCCACTTAATTCTCCATAGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAG 1960 1961 ATATTAC-----TTCTAAAGGCGGAAATTTAACCATTATTCTGGCGGATGGG 2008 2009 TTGATGTTCATAAAAATATTACGCTTGATCAGGGTTTTTTAAATATTACCGCCGCTTCCG 2068 2014 TTGATGTTCATAAAAATATCTCACTCGGGGCGCAAGGTAACATAAACATTACAGCTAAAC 2073 2069 TAGCTTTTGAAGGTGGAAATAACAAAGCACGCGACGGGCAAATGCTAAAATTGTCGCCC 2128

Tue Mar 25 08:39:01 2003

Page 34

CATCAGTGAATTATATATATATATATATATATATATATAT	AGGGCACHGTAACCATTACAGGGGAAAAGATTTCAGGGCTAACAACGTATCTTTAA
--	--

1181 CCAAGAATTTAAGCATCACCAACTCCAGCTCCACTTACCGCACTATTATAAGCGGCA 3240 3301 AAATTGGCGGCGATGTCTCGCAAAAAGAAGAAGTAATCTCACATTTCTTCTGACAAAATCA 3360 3188 ATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATCGGCGGAG 3247 3248 ATATAATCAACAAAAAAGGAAGCTTAAATTTACAGACAGTAATAATGATGCTGAAATCC 3307 3308 AAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGGATAAAATTA 3367 3368 ATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGAGGACTCTAGTTCAGATG 3427 3428 CGACAAGTAATGCCAACCTAACTATAAAACCAAAGAATTGAAATTGACAGAAGACCTAA 3487 3421 CGACAAACAATGCCAATCTAACCATTAAAACCAAAGAATTGAAATTAACGCAAGACCTAA 3480 3488 GTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCCAAAGATGGTAGAGATTTAACTATTG 3547 3598 AAGATTCAAAAATCTCTGCTGACGGTCACAAGGTGACACTACACAGCAAAGTGGAAACAT 3657 3788 C---GGAAAAGGTTACCACCACCACGCTCGACCATTAACGCAACAAATGGCAA---- 3839 3548 GCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAACAATGTTA 3607 3608 AAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTGAAAACAT 3667 3668 CTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACTATACTG 3727 3658 CCGGTAGTAATAACAACACTGAAGATAGCAGTGACAATAATGCCGGCTTAACTATCGATG 3717 3718 CAAAAAATGTAACAGTAAACAACAATATTACTTCTCACAAAAGCAGTGAGCATCTCTGCGA 3777 3778 CAAGTGGAGAAATTACCACTAAAACAGGTACAACCATTAACGCAACCACTGGTAACGTGG 3837 3840 ---- 3833 3840 -AGCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAA 3898 4018 GTGTAACCACTTCAAGTCAATCAGGGGATATCGGGGGTACGATTTCTGGTGGCACAGTAG 4077 3899 GTGTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGG 3958 3959 GTGAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGG 4018 4019 TAAATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGA 4078 3728 CAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATCACCGCGT 3787 3838 AGATAACCGCTCAAACAGGTAGTATCCTAGGTGGAATTGAGTCCAGCTCTGGCTCTGTAA 3897 3898 CACTTACTGCAACCGAGGGGGCGCTCTTGCTGAAGCAATATTTCGGGCAACACCGTTACTG 3957 3958 TTACTGCAAATAGCGGTGCATTAACCACTTTGGCAGGCTCTACAATTAAAGGAACCGAGA 4017 4078 AGGTTAAAGCAACCGAAAGTTTAACCACTCAATCCAATTCAAAATTAAAGCAACAACAG 4137 4138 GCGAGGCTAACGTAACAAGTGCAACAGGTACAATTGGTGGTACGATTTCCGGTAATACGG 4197 4198 TAAATGTTACGCCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGA 4257 4079 CAGAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTA 4138 3840 ----qq ŏ g òγ q δλ QQ δ qq Óχ qq Пр g qq ŏ οy δλ q ò δλ

```
4258 CAGAAGGAGCTGCAACCTTAACTACTACGGGCAAATTAACTACCGAAGCTAGTTCAC 4317
                                                  4139 GCATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAA 4198
                                                                      4199 GCATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCT 4258
                                                                                                                                      4259 CGGATATTAAAAGCAACCAGCGCACCTTGGTTATTAACGCAAAAGATGCTAAAGG 4318
                                                                                                                                                                                                            4438 CAAACATTAATGCAACCAGCGGTACCTTGGTTATTAACGCAAAAGACGCTGAGCTAAATG 4497
                                                                                                                                                                                                                                                        4319 GTGATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTG 4378
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4498 GCGCAGCATTGGGTAACCACACAGTGGTAAATGCAACCAAAGGCAAATGGCTCCGGCAGCG 4557
                                                                                                                                                                                                                                                                                                                          4379 TGACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGT 4438
                                                                                                                                                                                                                                                                                                                                              4439 TAAATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGG 4498
                                                                                                                                                                                                                                                                                                                                                                                                                                4618 TAAATATCATTTCAAAAACGGTATAAACACCGTACTGTTAAAAGGCGTTAAAATTGATG 4677
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4499 TGAAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGTAATTGAAGCGAAACGCGTCC 4558
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4559 TTGAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAA 4618
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4799 AGGTAGATTTCATCCTGCAATGAAGTCATTTATTTTCGTATTATTTACTGTGTGGGTTA 4858
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   5038 AAGITCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATT 5097
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4739 ATGGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACA 4798
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4978 AGGIAGATITCAICCIGCAAIGAAGICATITITATITITCGIAITIACIGIGIGIA 5037
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4859 AAGTICAGIACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATT 4918
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Non-typeable Haemophilus; high molecular weight surface protein; HMM1; hmwl gene; immunogen; vaccine; otitis media; ss.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Non-typeable Haemophilus influenzae hmw1 gene cluster.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              AAT90996 standard; DNA; 9171 BP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4919 TTAACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         5098 TTAACAGGTTATTATTATG 5116
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                14-APR-1998 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                AAT90996;
                                                                                  qq
                                                                                                                                                  q
                                                                                                                                                                                      οy
                                                                                                                                                                                                                  Q
                                                                                                                                                                                                                                                        δy
                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                          ô
                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                                                                                                                                                                          Ωp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ŏ
```

```
This nucleic acid comprises a gene cluster for the hmwl gene (see also ART90994) that encodes high molecular weight surface protein HMM1 (see AAW30293) of non-typeable Haemophilus influenzae strain 12. In addition to the hmwl gene there are 2 additional downstream open reading frames that are required for the correct processing and secretion of the hmwl gene product. The ORF-b derived amino acid sequence demonstrates similarity with the derived amino acid sequences of 2 genes which encode proteins required for secretion and activation of haemolysins of P. mirabilis and S. marcescens. HMM proteins (see AAW30291-44) can be used in vaccines, as immunogens for preparation of antibodies and as antigens for detection of
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            41 ATGACAAACAACAATTACAACACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAT 100
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     101 AGTATAAATCCGCCATATAAAATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATC 160
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    161 TITCATCITICATCITICATCITICATCITICATCITICATCITICATCITICATCITIC 220
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Query Match 52.0%; Score 2565.4; DB 18; Length 9171; Best Local Similarity 72.4%; Pred. No. 0; Matches 3708; Conservative 0; Mismatches 1096; Indels 315; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              281 GAATGAAGAGGAGCTGAACGAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCT 340
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             High molecular weight proteins of non-typeable Haemophilus influenzae - useful for vaccine production
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Sequence 9171 BP; 3085 A; 1855 C; 1794 G; 2437 T; 0 other;
                                                                                                                                                                                                                                                                                                                                                                                                                                                    Disclosure; Page 78-82; 183pp; English.
                                                      /*tag= a /note= "hmw1 gene" | 5114..6748 | /*tag= b /note= "ORF-b" | 7062..9011 | /*tag= c /note= "ORF-c"
                              Location/Qualifiers
Haemophilus influenzae strain 12.
                                                                                                                                                                                                                                                                           96US-0617697.
                                                                                                                                                                                                                                              97WO-US04707
                                           ..4958
                                                                                                                                                                                                                                                                                                       (BARE/) BARENKAMP S J.
                                                                                                                                                                                                                                                                                                                                                              WPI; 1997-503038/46.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               for preparation o
these antibodies.
                                                                                                                                                                                                                                                                                                                                                                             P-PSDB; AAW30293
                                                                                                                                                                                                                                                                                                                                    Barenkamp SJ;
                                                                                                                                                                                      WO9736914-A1.
                                                                                                                                                                                                                                              01-APR-1997;
                                                                                                                                                                                                                                                                           01-APR-1996;
                                                                                                                                                                                                                 09-OCT-1997.
                                                                                    CDS
                                                                                                                              CDS
 ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         рp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
```

17;

341 TAGGAGAAAATATGAACAAGATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGG 400

δy

qq	340	
oy Op	401	TIGCIGIGICIGAALTGGCACGGGGTIGIGACATTCCACAGAAAAGGCTTCCGCTATG 460 
Sy Op	461 460	THACTATCTTTAGGTGTAACCACTTAACGTTAAAGCCACTTTCCGCTATGTTACTATCTT 520
ç Q	521 520	TAGGTGTAACATCTATTCCACAATCTGTTTTAGCAAGGGCTTACAAGGAATGGATGTAG 580 
ογ Db	581 580	TACACGGCACAGCCACTATGCAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTG 640 
oy Db	641 640	ACGCTATCATTAAATTGGAAACAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTAC 70
çy Op	701	AAGAAAACAACACCCCCGTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAA 760
ya Bb	761 760	AAGGGATTTTAGATTCTAACGGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAG 820 
Qy Dp	821 820	GTAAAGACGCAATTATTAACACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACG 880
Qy Dp	881 880	AAAACATGAAGGCGGTAATTTCACCTTCGAGCAAAGGATAAAGGGCTCGCTGAAA 940 
Qy Db	941 940	TIGIGAAICACGGITIAATIACIGICGGIAAAGACGGCAGIGIAAAICITATIGGIGGCA 1000 
Oy 1 Db 1	1001	AAGTGAAAAACGAGGGTGTGATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGC 1060
Oy 1 Db 1	1061 1060	AAAAAATCACCATCAGCGATATAATAAACCCAACCATTACTTAC
Qy 1	1121	AAAATGAAGGGGTCAATCTGGGGGATATTTTGCCAAAGGGGGTAACATTAATGTCCGTG 1180
Qy 1 Db 1	1181	CTGCCACTATTCGAAACCAAGGTAAACTTTCTGCTGATTCTGTAAGGAAAGATAAAAGCG 1240 
Oy 1 Db 1	1241	GCAATATTGTTCTTTCGCCAAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTC 1300
Oy 1 Db 1	1301	AAAATCAGCAAGCTAAAGGGGGCAAGCTGATGATTACAGGGGATAAAGTCACATTAAAAA 1360 
Oy 1 Db 1	1361 1310	CAGGTGCAGTTATCGACCTTTCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACG 1420 
0y 1	1421	AGCGCGCGAAGGTAAAAACGGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGCT 1480

```
2186 ATAAATTTGAAGGGACTTTAAATATTTCAGGGAAAGTGAACATCTCAATGGTTTTACCTA 2245
1370 AGGGGGGGAAGGTAAAAACGGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAAGGCT 1429
                                                  1481 CAACCATCAATGTATCAGGCAAAGAAAAAGGCGGACGCGCTATTGTGTGGGGGGGATATTG 1540
                                                                               1541 CGTTAATTGACGCAATATTAACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTT 1600
                                                                                                                                                                                                                   1490 CGTTAATTGACGCCAATATTAACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTT 1549
                                                                                                                                                                                                                                                                      1601 TTGTGGAGACATCGGGGCATTATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAG 1660
                                                                                                                                                                                                                                                                                                  1661 AGTGGTTGCTAGACCCTGATGATGTAACAATTGAAGCCCGAAGACCCCCTTCGCAATAATA 1720
                                                                                                                                                                                                                                                                                                                                                                                                             1670 CTTCAGAAGACGATGAATACACGGGATCCGGGAATAGTGCCAGCACCCCAAAACGAAACA 1729
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1781 GCGAACTCAAAACAACGCTAACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGA 1840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1901 ACTCCCACTTAATTCTCCATAGTAAAGGTCAGCGTGGCGGGAGGCGTTCAGATTGATGGAG 1960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1844 ATGGCAGCTTAACTCTTTGGAGTGAGGGTCGGAGCGGTGGCGGCGTTGAGATTAACAACG 1903
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1961 ATATTAC------TCTAAAGGCGGAAATTTAACCATTTATTCTGGCGGATGGG 2008
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1904 ATATTACCACCGGTGATGATACCAGAGGTGCAAACTTAACAATTTACTCAGGCGGCTGGG 1963
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   2009 ITGATGTTCATAAAATATTACGCTTGATCAGGGTTTTTTAAATATTACCGCCGCTTCCG 2068
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1964 ITGATGTTCATAAAATATCTCACTCGGGGCGCAAGGTAACATAAACATTACAGCTAAAC 2023
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           2069 TAGCTTTTGAAGGTGGAAATAACAAAGCACGCGACGCGGCAAATGCTAAAATTGTCGCCC 2128
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 2024 AAGATATCGCCTTTGAGAAGGAAGCAACCAAGTC------ATTACAGGTC 2068
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    2129 AGGGCACTGTAACCATTACAGGAGAGAAAAAATTTCAGGGCTAACAACGTATCTTTAA 2188
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   2069 AAGGGACTATTACC---TCAGGCAATCAAAAAGGTTTAGATTTAATAATGTCTCTATAA 2125
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            2189 ACGGAACGGGTAAAGGTCTGAATATCATTTCATCAGTGAATAATTTA------ACCC 2239
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  2240 ACAATCTTAGTGGCACAATTAACATATTGGGGAATATAACAATTAACCAAACTA---CGA 2296
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             2297 GAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGGAACGTCAGTGCTCTTA 2356
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   2246 AAAATGAAAGTGGATATGATAAATTCAAAGGACGCACTTACTGGAATTTAACCTCGAAAG 2305
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2357 ATCTAGAGACAGGCGCAAATTTTACCTT---TATTAAATACATTCAAGCAATAGCAAAG 2413
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2306 TGGATATGATAAATTCAAAGGACGCCCTCACTATTGACTCCAGAGGAAGCGATAGTGCAG 2365
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2414 GCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGCGTAAATGGCAACA 2473
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 2366 GCACACTTACCCAGCCTTATAAATTTAAACGGTATATCATTCAACAAGACACT---ACCT 2422
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      2474 TGTCATTCAATCTCAAAGAAGGGGGGGAAAGTTAATTTCAAATTAAAACCAAAACGAGAACA 2533
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2423 TTAATGTTGAACGAAATGCAAGAGTCAACTTTGACATCAAGGCACCAATAGGGATAAATA 2482
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                        δλ
                                                                                                                                                                                                                                                                                                                   Db
                                                                                                                                                                                                                                                                                                                                                                            δy
                                                                                                                                                                                                                                                                                                                                                                                                                                 В
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ŏ
```

2483 AGTATTCTAGTTTGAATTACGCATCATTTAATGGAAACATTTCAGTTTCGGGAGGGGGGA 2542 2543 GIGITGATITCACACTICTCGCCTCATCCTCTAACGICCAAACCCCCGGIGIAGTIAIAA 2602 2603 ATTCTAAATGCTTTAATGTTTCAACAGGGTCAAGTTTAAGATTTAAAACTTCAGGCTCAA 2662 2534 TGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACAGCCACTGGTGGGG 2593 2594 GCTCTGTTT-----TTTTTGATATATATGCCAACCATTCTGGCAGGGGGCTGAGTTAA 2647 2648 AAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCATGTTCGCG 2707 2708 GCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCAAATTTCA 2767 2663 CAAAAACTGGCTTCTCAATAGAGAAAGATTTAACTTTAAATGCCACC-----GGAGGCA 2716 2717 ACATAACACTITIGCAAGTIGAAGGCACCGAIGGAAIGAIIGGIAAAGGCAIIGIAGCCA 2776 2828 CCTACAACATATCCATTCTGGGGGGTAATGTCACCCTTGGTGGACAAAACTCAAGCAGCA 2887 2777 AAAAAAACATAACCTTTGAAGGAGGTAAGATGAGGTTTGGCTCCAGGAAAGCCGTAACAG 2836 2888 GCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCCAATAACG 2947 2837 AAATCGAAGGCAATGTTACTATCAATAACAACGCTAACGTCATCTTATCGGTTCGGATT 2896 2948 CCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTCGTTAATG 3007 2897 TTGACAACCATCAAAAAC-----CTTTAACTATTAAAAAAGATGTCATCATTAATAGCG 2950 2951 GCAACCTTACCGCTGGAGGCAATATTGTCAATATAGCCGGAAATCTTACCGTTGAAAGTA 3010 3011 ACGCTAATTTCAAAGCTATCACAAATTTCACTTTTAATGTAGGCGGCTTGTTTGACAACA 3070 3128 ATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGCAATGTTACCAATG 3187 3071 AAGGCAATTCAAATATTTCCATTGCCAAAGGAGGGGCTCGCTTTAAAGACATTGATAATT 3130 3188 ATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATCGGCGGAG 3247 3131 CCAAGAATTTAAGCATCACCACCAACTCCAGCTCCACTTACCGCACTATTATAAGCGGCA 3190 3308 AAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGATAAAATTA 3367 3311 ATATTACCAAACAGATAACAATCAAGGCAGGTGTTGATGGGGAGAATTCCGATTCAGACG 3370 3431 ATATTTCAGGTTTCAATAAAGCAGAGATTACAGCTAAAGATGGTAGTGTTTAACTATTG 3490 3548 GCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAACAATGTTA 3607 3008 GGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATTTCAGAAA 3067 3068 GCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTTACCAATA 3127 3248 ATATAATCAACAAAAAAGGAAGCTTAAATTTACAGACAGTAATAATGATGCTGAAATCC 3307 ATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGGGGGCTCTAGTTCAGATG 3427 3428 CGACAAGTAATGCCAACCTAACTAATAAAACCAAAGAATTGAAATTGACAGAAGACCTAA 3487 3488 GTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTAACTATTG 3547 3368 qq qq qq Q qq QQ g g δy Qγ ŏ qq ŏ QΩ δ g ολ δ ò ò Dp δ δ ŏ Db g Оb δ ò q οy

3788 C---GGAAAAGGTTACCACCACCACGGCTCGACCATTAACGCAACAAATGGCAA---- 3839 3728 CAAGTGGAGAAATTACCACTAAAACAGGTACCATTAACGCAACCACTGGTAACGTGG 3787 3840 ------ 3839 3968 GTGTAACCACTTCAAGTCAATCAGGCGATATCGGCGGTACGATTCTGGTGGCACAGAAG 4027 4019 TAAATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGA 4078 4079 CAGAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTGAAGCCGGTTCTA 4138 3668 CTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACTATTACTG 3727 3608 CCGGTAGTAATAACAACACTGAAGATAGCAGTGACAATAATGCCGGCTTAACTATCGATG 3667 3728 CAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATCACGGGT 3787 3668 CAAAAAATGTAACAGTAAACAACAATATTACTTCTCACAAAGCAGTGAGCATCTCTGCGA 3727 3788 AGATAACCGCTCAAACAGGTAGTATCCTAGGTGGAATTGAGTCCAGCTCTGGCTCTGTAA 3847 3848 CACTTACTGCAACCGAGGGCGCTCTTGCTGTAAGCAATATTTCGGGCAACACGTTACTG 3907 3840 ----- 3839 3908 TTACTGCAAATAGCGGTGCATTAACCACTTTGGCAGGCTCTACAATTAAAGGAACCGAGA 3967 3840 -AGCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAAACACGGTAA 3898 3899 GTGTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAATTGAAGGGAAATTGGG 3958 3959 GTGAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGG 4018 4139 GCATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAA 4198 4199 GCATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCT 4258 4328 GTATTAATGCCGCCAATGTGACACTAAATACTACAGGCACTTTAACTACCGTGAAGGGTT 4387 4259 CGGATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAATG 4318 4388 CAAACATTAATGCAACCAGCGGTACCTTGGTTATTAACGCAAAAGACGCTGAGCTAAATG 4447 4319 GTGATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTG 4378 4379 TGACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGGATTTAAACACAGTAAATGGGT 4438 4439 TAAATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGG 4498 4448 GCGCAGCATTGGGTAACCACAGTGGTAAATGCAACCCAACGCAAATGGCTCCGGCAGCG 4507 4568 TAAATATCATTTCAAAAAACGGTATAAACACCGTACTGTTAAAAGGCGTTAAAATTGATG 4627 4499 TGAAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCC 4558 QΩ Q ōλ Dp Dp Dp òγ g Pp οy Db οy pp δ QQ qq ò QD q g δ ò òγ d δ ŏλ Dp οy δ

```
4628 TGAAATACATTCAACCGGGTATAGCAAGCGTAGATGAAGTAATTGAAGCGAAACGCATCC 4687
                                            4559 TIGAAAAAAGTAAAAGATTTATCTGATGAAGAAGAGAAACATTAGCTAAACTTGGTGTAA 4618
                                                                            4688 TTGAGAAGGTAAAAGATTTATCTGATGAAGAAAGGGGATGGCTTAGCTAAACTTGGCGTAA 4747
                                                                                                           4619 GTGCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTA 4678
                                                                                                                          4679 CAACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTA 4738
                                                                                                                                                                                       4739 ATGGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACA 4798
                                                                                                                                                                                                                                                                                                  4799 AGGTAGATITCATCCTGCAATGAAGTCATITIATITITCGTATTATTACTGTGTGGGTTA 4858
                                                                                                                                                                                                                                                                                                                   4859 AAGTICAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTT 4918
                                                                                                                                                                                                                                                                                                                                                                                  4988 AAGTICAGTACGGCCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAAATTTT 5047
                                                                                                                                                                                                                                                                      4868 ATGCCGCGACGGTGTGCGTTAATATCGCTGATAACGGGCGGTAGCGGTCAGTAATTGACA 4927
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Non-typeable Haemophilus; high molecular weight surface protein;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Non-typeable Haemophilus high mol.wt. surface protein HMW4 gene.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       High molecular weight proteins of non-typeable Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /transl_except= (pos:1114..1116, aa:Thr)
/transl_except= (pos:1198..1200, aa:Asp)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      HMW4; immunogen; vaccine; otitis media; ss
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          influenzae - useful for vaccine production
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Claim 1; Page 90-92; 183pp; English
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Haemophilus influenzae strain 5.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        AAT90993 standard; DNA; 4803 BP
                                                                                                                                                                                                                                                                                                                                                                                                                             4919 TTAACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                              5048 TTAACAGGTTATTATTATG 5066
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                97WO-US04707
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             96US-0617697
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        14-APR-1998 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /*tag= a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    .4803
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (BARE/) BARENKAMP S J.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         WPI; 1997-503038/46.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          P-PSDB; AAW30292.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 WO9736914-A1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              01-APR-1997;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             01-APR-1996;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               09-0CT-1997
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         AAT90993;
             g
                                                                          QQ
                                                                                                           ò
                                                                                                                                        q
                                                                                                                                                                       ò
                                                                                                                                                                                                     엄
                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                    ŏ
                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                             δλ
```

```
2 Novel nucleic acids (AAT90992 and AAT90993) respectively comprise the coding sequences of high molecular weight surface proteins HWM3 (see AAW30291) and HWM4 (see AAW30292) of Haemophilus influenzae strain 5. HWM3 has a mol. Wt. of 125 Mba and HWM4 has a mol. Wt. of 125 Mba. Both are antigenically related to HWM1 (see AAW30293) and HWM2 (see AAW30294) obtained from non-typeable H. influenzae strain 12. Vectors containing HWM nucleic acids for transformation of a host are claimed. HWM nucleic acids can also be used a probes for the
                                                                                                                                                                                                                                                                                                             Query Match 45.5%; Score 2245; DB 18; Length 4803; Best Local Similarity 70.6%; Pred. No. 0; Matches 3411; Conservative 0; Mismatches 990; Indels 432; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            952 GGTTTAATTACTGTCGGTAAAGACGGCAGTGTAAAATCTTATTGGTGGCAAAGTGAAAAAC 1011
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1012 GAGGGTGTGATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACC 1071
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1132 GTCAATCTGGGCGATATTTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCTGCTATT 1191
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               61 GAATTGACACGGGGTTGTGACCATTCCACAGAAAAGGCAGTGAAAAACCTGTTCGTACG 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               592 GCCACTATGCAAGTAGATGGTAATAAAACCATTATCGCAACAGTGTTGACGCTATCATT 651
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              661 GAGGGCGTGATTAGCGTAAATGGCGGTAGTATTTCTTTACTTGCAGGGCAAAAATCACC 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           352 ATGAACAAGATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTT 411
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       472 AGGTGTAACCACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACA 531
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               532 TCTATTCCACAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACA 591
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            241 GCAACCATGCAAGTAGACGGCAATAAAACCACTATCCGTAATAGCGTCAATGCTATCATC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      652 AATTGGAAACAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAAC 711
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         712 AACTCCGCCGTATTCAACCGTGTTACATCTAAAATCTCCCAATTAAAAGGGATTTTA 771
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   361 AACTCTGCCGTTTTCAACCGTGTTACATCTGACCAAATCTCCCAATTAAAAGGGATTTTA 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     412 GAATTGGCACGGGGTTGTGACCATTCCACAGAAAAAGGCTTCCGCTATGTTACTATTTT 471
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              772 GATTCTAACGGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCA 831
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  832 ATTATTAACACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAG 891
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       detection of related genes. HMW proteins, conjugates and peptides can be used in vaccines, as immunogens for preparation of
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      antibodies and as antigens for detection of these antibodies.
                                                                                                                                                                                                                                                                     Sequence 4803 BP; 1714 A; 928 C; 971 G; 1190 T; 0 other;
                                                                                                                                                      are claimed. HMW nucleic ac detection of related genes.
         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Ωp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         οg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
```

```
1786 AATAAAGATGATAAACAATTTAGATTCAATAATGTATCTATTAACGGGGGGGCGAGGGT 1845
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  2206 CTGAATATCATTCATCAGTGAATAATTTAACCCACAATCTTAGTGCCACAATTAACATA 2265
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    2146 ACAGGAGAGGAAAAGATTTCAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGT 2205
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           2086 AATAACAAAGCACGGGACAAATGCTAAAATTGTCGCCAGGGCACTGTAACCATT 2145
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1726 GGCGATAAAGCACGTAACGCAACAGATCTCAAATTACCGCACAAGGGACGATAACCGTC 1785
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1666 ACGCTTGGTACGGGTTTTTTGAATATTGTCGCTGGGGATTCTGTAGCTTTTGAGAGAG 1725
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1606 AACGAAAATGGTAATTTAACCATTAAAGCAGGCTCTTGGGTTGATGTTCATAAAACATC 1665
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2029 ACGCTTGATCAGGGTTTTTTAAATATTACCGC---CGCTTCCGTAGCTTTTGAAGGTGGA 2085
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1972 a---aaggcggaaatttaaccatttattctggcggatgggttgatgttcataaaatatt 2028
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1912 ATTCTCCATAGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGAGAATATTACTTCT 1971
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1555 ACACTICACACTAAA-----CGAGATGGAGTTAAAATTAACGGTGATATTACCTCA 1605
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1852 ACGGCATCAAGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTA 1911
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1378 CAAGGATATACAACAGGAGATGGGACTAAAGAGTCACCTAAAGGTAATAGTATTGTAAA 1437
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1792 ACAACGCTAACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATA 1851
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1438 CCTACATTAACAAACTCAACTCTTGAGCAAATCCTAAGAAGAGGTTCTTATGTTAATATC 1497
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1318 GACCCAGATGATGTGCCATTGAAACTCTTACATCTGGACGCAATAATACGGGCGAAAAC 1377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1612 TCGGGGCATTATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTA 1671
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1258 TCAGGACATGACTTATCCATTGGTGATGATGTTGTTGATGACGCTAAAGAGTGGTTATTA 1317
                                                                                                                                                                                                                                                                                             1081 GGTAAAAATGGTATTCAATTAGCGAAGAAACCTCTTTAGAAAAGGCTCGACAATTAAT 1140
                                                                                                                                                                                                                                                                                                                                              1492 GTATCAGGCAAAGAAAAAGGCGGACGCGTATTGTGTGGGGCGATATTGCGTTAATTGAC 1551
                                                                                                                                                                                                                                                                                                                                                                 1552 GGCAATATTAACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACA 1611
                                                                                                                                                                                                                                                                                                                                                                                                                                      1201 GGTAACATTAATGCTCAAGGTA---GCGATATTGCTAAAACTGGCGGCTTTGTGGAAACA 1257
                                                                                                                                                                                                                            1432 GGTAAAAAGGGGATTCAATTAGGAAAGAAAACCTCTTTAGAAAAAGGCTCAACCATCAAT 1491
                                                                                                                                                         1372 ATCGACCITICAGGTAAAGAAGGGGGAGAAACTIACCITGGCGGTGACGAGGGCGGGGAA 1431
1312 GCTAAAGGCGGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGGGGGAGTT 1371
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ДQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Ω
```

g ŏλ

ò g οy qq ò

Ωp ò ОD

Ωp οy

рp δλ

ò

qq

qq ò

qq οy

QQ õ

Dp

g

3331 AAAGAAGGCAACCTCACGATTTCTTCCGATAAAATTAATATCACCAAACAGATAACAATC 3390 3211 CAGGCTAAACGCAACCAAAGAAGCATCATCGGCGGAGATATAATCAACAAAAAAAGGAAGC 3270 3154 CAAGGAGTGGTAAAACT --- TGGCAATGTTACCAATGATGGTGATTTAAACATTACCACT 3210 2806 CAAGGAGTGGTAAAACTCCAAGGCGATATTATCAATAAAGGTGGTTTAAATATCACTACT 2865 3034 GCAGATATTAAAGGCAATCTCACTATTTCAGAAAGCGCCACTTTTAAAGGAAAGACTAGA 3093 2686 GCAAACATTGTCGGCAATCTTTCTATTGCAGAAGATTCCACATTTAAAGGAGAAGCCAGT 2745 3094 GATACCCTAAATATCACCGCCAATTTTACCAATAATGGCACTGCCGGAAATTAATAACA 3153 2974 AGAGITATAAAACTIGGCAGCITGCICGTIAATGGGAGTITAAGITTAACTGGCGAAAAT 3033 2626 AGAACTCTAACTCTTGGGAATATATCTGTTGAGGGGAATTTAAGGCCTAACTGGTGCAAAT 2685 2914 AAAGCAGCAAATGTTACGCTAGAAGCCAATAACGCCCCTAATCAGCAAAACATAAGGGAT 2973 2566 AATAAAGCAAATTACAAGCTGACAGCAACAACAACAACAACAAGGTTGAAGAAA 2625 2506 AATGTCACTCTAGGTGGGGAAAATTCAAGCAGTAGCATTACGGGCAATATCAATATCACC 2565 2386 GACTTAACTATAAATGCAACTGGCTCGAATTTTAGTCTTAAGGAAAGAATGTTTT 2445 2794 TATGACGGGTACGCACGCAATGCCATCAATTCAACCTACAACATATCCATTCTGGGCGGT 2853 2854 AATGTCACCCTTGGTGGACAAAACTCAAGCAGCAGTAACGGGGAATATTACTATCGAG 2913 2734 GACTTAACCATAAATGCAACCAATTCAAATTTCAGCCTCAGACGAAAGATGATTT 2793 2674 GGCGCTAATTTTACCTTAAATTCCCATGTTCGCGGCGATGACGCTTTTAAAATCAACAAA 2733 2560 CGGTTTTTAGCCAATATCACAGCCACTG-----GTGGGGGCTCTGTTTTTTTTTATATA 2613 2614 TATGCCAACCATTCTGGCAGAGGGGCTGAGTTAAAAATGAGTGAAATTAATATCTCTAAC 2673 2266 cacgccaarcrraccrcragagcrgccggcaraaacarggarrcaarraacarracggc 2325 2500 AAAGITAATITCAAAITAAAACCAAACGAGAACATGAACACAAGCAAACCTITACCAAIT 2559 2440 GCAGGGGTGAATTTTAACGGCGTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCG 2499 2086 GCAGGCGTACATTTAACGGCATCGGAGGCAAAACAAACTTCAACATCGGAGCTAACGCA 2145 2386 ATTAAATACATTTCAAGG-----AATAGCAAAGGCTTAACAACAGTATAGAAGCTCT 2439 2026 ATANAMATTCGTTGATAGCGGCTCAAATTCCCAAGATTTGAGGTCATCACGTAGAGTTTT 2085 2326 CATGATTCGCACTGGAACGTCAGTGCTCTTAATCTAGAGAGGGGGCAAATTTTACCTTT 2385 1966 AAAGACTCTTACTGGAATGTTTCTTCTTTAGTTTGAATACGGTGCAAAAATTTACCTTT 2025 qq δλ οp δy qq δy qq δÿ qq  $\delta$ qq QΥ οqα οy qq QΥ Dp ò Q Óλ qq ά δλ Dp δy qq ÓΫ qq qq ò qq δ

```
4051 GCAAGCACTGGTGATTTAACTATTGGAAATAGTGCAAAAGTTGAAGCGAAAAATGGAGCT 4110
                                4090 GCAACCTTAACCGCAACAGGAATACCTTGACTACTGAAGCCGGTTCTAGCATCACTTCA 4149
                                                           4150 ACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGCATTAATGCT 4209
                                                                          4210 GCTAATGTGACATTAAATACTACAGGCACCTTAACCACGGTGGGAGGCTCGGATATTAAA 4269
                                                                                                                 4270 GCAACCAGCGCCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGTGATGCATCA 4329
                                                                                                                                                       4330 GGTGATAGTAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTGACTGCGGCA 4389
                                                                                                                                                                                                                                     4390 ACCICAAGCAGIGIGAAIAICACIGGGGAITIAAACACAGIAAAIGGGITAAAIAICAIT 4449
                                                                                                                                                                                                                                                               4450 TCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTGAAATATATC 4509
                                                                                                                                                                                                                                                                           4510 CAGCCAGGTGTAGCAAGTGTAGAAGTAATTGAAGCGAAACGGGTCCTTGAAAAGTA 4569
                                                                                                                                                                                                                                                                                                                                              4570 AAAGATTTATCTGATGAAGAAAGAAGAATTAGCTAAACTTGGTGTAAGTGCTGTACGT 4629
                                                                                                                                                                                                                                                                                                                                                           4630 TTTGTTGAGCCAAATAAFACAATTACAGTCAATACACAAAATGAATTTACAACCAGACG 4689
                                                                                                                                                                                                                                                                                                                                                                                                  4690 TCAAGTCAAGTGATAATTTGTGAAGGTAAGGCGTGTTTCTCAAGTGGTAATGGGGAGGA 4749
                                                                                                                                                                                                                                                                                                                                                                                                                                         Partial sequence encoding high molecular weight protein 4 (HMW4).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      HMW; high molecular weight protein; virus; vaccine; influenza;
epitope; immunity; haemophilus influenzae; ss.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /*tag= a
/product= High molecular weight protein 4.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /*tag= b
/transl_except= TCT encodes Threonine.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4750 GTATGTACCAATGTTGCTGACGATGGACAGCCG 4782
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4771 GTATGTACCAATGTTGCTGACGATGGACAGCAG 4803
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        AAQ49511 standard; DNA; 4702 BP.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              26-APR-1994 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             AAQ49511;
                                                                                                   δ
                                                                                                                                           Qγ
                                                                                                                                                              Op
                                                                                                                                                                                 ò
                                                                                                                                                                                                     q
                                                                                                                                                                                                                                            οp
                                                                                                                                                                                                                                                                οy
                                                                                                                                                                                                                                                                                  QQ
                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                              ŏ
                                                                                                                                                                                                                                                                                                                                                                   ρp
                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                         pp
                                                                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
```

```
2182 TCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTTCATCAGTGAATAATTTAACCCAC 2241
                                                                                                                                                                                                                                                                                                                                                                                                           Dβ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ΩD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            αd
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   òχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Óχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                             Д
                                                                                                                                                  ŏλ
                                                                                                                                                                                    g
                                                                                                                                                                                                                           òχ
                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                 ŏλ
                                                                                                                                                                                                                                                                                                                                  Dp
                                                                                                                                                                                                                                                                                                                                                                        δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                 QΫ́
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ÓΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    CTTATTGGTGGCAAAGTGAAAAACGAGGGTGTGATTAGCGTAAAATGGTGGCAGCATTTCT 1047
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Query Match 44.6%; Score 2203.8; DB 14; Length 4702; Best Local Similarity 70.7%; Pred. No. 0; Matches 3347; Conservative 0; Mismatches 952; Indels 432; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        688 GIGCAGTTTTTACAAGAAAACAACTCCGCCGTATTCAACCGTGTTACATCTAACCAA 747
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             748 ATCTCCCAATTAAAAGGGATTTTAGATTCTAACGGACAAGTCTTTTTAATCAACCCAAAT 807
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GACATTTCTAACGAAAACATCAAGGCGCGTAATTTCACCTTCGAGCAAACCAAAGATAAA 927
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       302 GACATITCTAACGAAAACATCAAGGCGCGTAATTTCACCCTTGAGCAAACCAAGGATAAA 361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           928 GCGCTCGCTGAAATTGTGAATCACGGTTTAATTACTGTCGGTAAAGACGGCAGTGTAAAT 987
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              362 GCACTCGCTGAAATCGTGAATCACGGTTTAATTACCGTTGGTAAAGACGGTAGCGTAAAC 421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              568 GGAATGGATGTAGTACACGGCACAGCCACTATGCAAGTAGATGGTAATAAAACCATTATC 627
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  628 CGCAACAGTGTTGACGCTATCATTAATTGGAAACAATTTAACATCGACCAAAATGAAATG 687
                                                                                                                                                                                                                                                                                                                                                                                                                                                              The isolation and purification of the high molecular weight protein enables the identification of the major protective epitopes of the protein by conventional epitope mapping. These epitopes can then be synthesised using standard techniques and incorporated into fully
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2 GGAATGAGCGTCGTACACGGTACAGCAACCATGCAAGTAGACGGCAATAAAAACCACTATC 61
                              /transl_except= AAT encodes Aspartic acid.
                                                                                                                                                                                                                                                                                                                                                                      High molecular weight surface proteins – of non-typeable haemophilus which exhibit immunogenic properties
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Sequence 4702 BP; 1691 A; 897 C; 944 G; 1170 T; 0 other;
                                                                                                                                                                                                                                       (INRM ) INSERM INST NAT SANTE & RECH MEDICALE.
                                                                                                                                                                                                                                                                                                                                                                                                                            Claim 6; Figure 9; 100pp; English.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            synthetic or recombinant vaccines.
                                                                                                                                                  93WO-US02166.
                                                                                                                                                                                    92GB-0005704.
misc_difference 983..985
                                                                                                                                                                                                                        BARE/) BARENKAMP S J.
                                                                                                                                                                                                                                                                                                                   WPI; 1993-320683/40.
                                                                                                                                                                                                                                                                                                                                    P-PSDB; AAR41732
                                                                                                                                                                                                                                                                              Barenkamp SJ;
                                                                                                                                                  16-MAR-1993;
                                                                                                                                                                                    16-MAR-1992;
                                                                                                             30-SEP-1993.
                                                                         WO9319090-A.
```

Op

Q

δy

g

ö

Q

òγ Q οy

Qγ

868

Q

ò q δ q

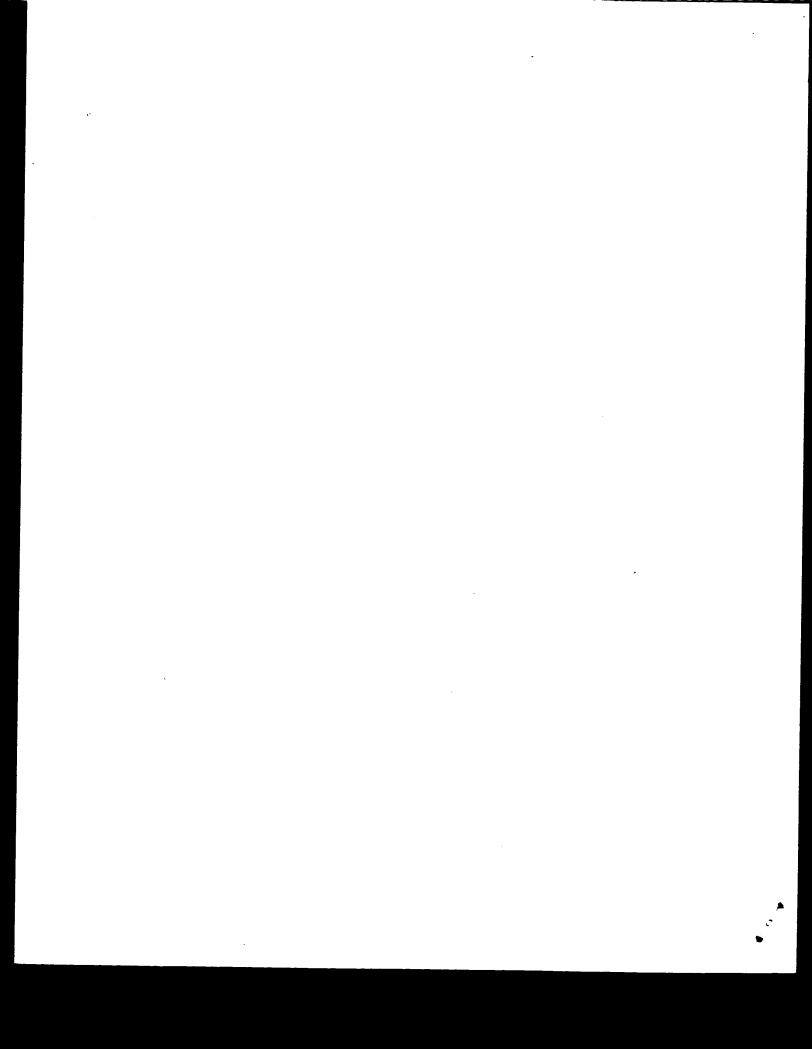
1019 AAAACTGGCGGCTTTGTGGAAACATCAGGACATGACTTATCCATTGGTGATGATGTGATT 1078 1199 CCTAAAGGTAATAGTATTTCTAAACCTACATTAACAAACTCAACTTGAGCAAATCCTA 1258 1259 AGAAGAGGTTCTTATGTTAATATCACTGCTAATAATAGAATTTATGTTAATAGCTCCATC 1318 1888 AACATCGGAAGCAACTCCCACTTAATTCTCCATAGTAAAGGTCAGCGTGGCGGAGGCGTT 1947 1367 AAAATTAACGGTGATATTACCTCAAACGAAAATGGTAATTTAACCATTAAAGCAGGCTCT 1426 1487 GATTCTGTAGCTTTTGAGAGAGGGGGGGATAAAGCACGTAACGCAACAGATGCTCAAATT 1546 2122 GTCGCCCAGGGCACTGTAACCATTACAGGGAAAAAGATTTCAGGGCTAACAACGTA 2181 1528 TGGGGCGATATTGCGTTAATTGACGCCAATATTAACGCTCAAGGTAGTGGTGATATCGCT 1587 1648 GTTAAAACAAAAGAGTGGTTGCTAGACCCTGATGATGTAACAATTGAAGCCGAAGACCCC 1707 1768 CCTAAAAAAAATAGCGAACTCAAAACAACGCTAACCAATACAACTATTTCAAATTATCTG 1827 1828 AAAAACGCCTGGACAATGAATATAACGGCATCAAGAAAACTTACCGTTAATAGCTCAATC 1887 1948 CAGATTGATGGAGATATTACTTCTA---AAGGCGGAAATTTAACCATTTATTCTGGCGGA 2004 2005 TGGGTTGATGTTCATAAAAATATTACGCTTGATCAGGGTTTTTTAAATATTACCGC---C 2061 2062 GCTTCCGTAGCTTTTGAAGGTGGAAATAACAAGCACGCGGCGGCGAAATGCTAAAATT 2121 1108 ATTGCCGCGCCTGAAAATGAAGCGGTCAATCTGGGCGATATTTTGCCAAAGGCGGTAAC 1167 1168 ATTAATGTCCGTGCTGCCACTATTCGAAACCAAGGTAAACTTTCTGCTGATTCTGTAAGC 1227 1228 AAAGATAAAAGCGGCAATATTGTTTTTCCGCC**AAAGA**GGGTGAAGCGGAAATTGGCGGT 1287 1288 GTAATTTCCGCTCAAAATCAGCAAGCTAAAGGCGGCCAAGCTGATGATTACAGGCGGTAAA 1347 1348 GTCACATTAAAAACAGGTGCAGTTATCGACCTTTCAGGTAAAGAAGGGGGAAAACTTAC 1407 1408 CTTGGCGGTGACGAGGGCGGCGAAGGTAAAACGGCATTCAATTAGCAAAGAAAACCTCT 1467 842 CTTGGCGGTGATGAGCGTGGCGAAGGTAAAAATGGTATTCAATTAGCGAAGAAAACCTCT 901

qq	1607	
δ P	2242	AARTCTTAGTGGCACAATTAACATATCTGGGAATATAACAATTAACCAACTACGAGAAG 2301 
Qγ	2302	236
qq	1727	GATGTTAAATACTGGAATGCATCAAAAGACTCTTACTGGAATGTTTCTTCTTTACTTTG 1786
Q:Y DD	2362	GAGACAGGCGCAAATTTTACCTTTATTAAATACATTTCAAGCAATAGCAAAGGC 2415 
و م	2416	TTAACAACACTATAGAAGCTCTGCAGGGGTGAATTTTAACGGCGTAATTGCAACATG 2475
3 6	* *	061
S cy	1907	TCATTCATACTAAGAAGAAGCAACAAAGTTAATTCAAACCAAACGAAACAGATG 2535
Qy Db	2536 1967	AACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACAGCCACTGGT 2589
Qγ	2590	GGGGCCTCTGTTTTTTGATATATGCCAACCATTCTGGCAGAGGGGCTGAGTTAAAA 2649
Db	2027	crcrcrcargrrrcacaracac
QY	2650	
Op	2087	AFGGAFTCAAFTAACAFTACCGGCGGGCTTGACFTFTCCATAACATCCCATAATCGCAAF 2146
Qy Dp	2710	GATGACGCTTTTAAAATCAACAAGACTTAACCATAAATGCAACCAATTCAAATTTCAGC 2769 
δλ	2770	CTCAGACAGACGAAAGATGATTTTATGACGGGTACGCACGC
QQ	2207	GATTCT
Qy Db	2830	TACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCAAGCAGCAGC 2889   1   1   1   1   1   1   1   1   1   1
ΟŸ	2890	ATTACGGGGAATATTACTATCGAGAAAGCAGAAATGTTACGCTAGAAGCCAATAACGC 2949
QQ	2327	ATTACGGGCAATATCAATAACACAAATGTTACATTACAAGCTGACAGGC 2386
ογ	95	G 300
ΩD	2387	AACAGCAACACGCTTGAAGAAAGAACTCTAACTCTTGGCAATATATCTGTTGAGGGG 2446
QY Dp	3010	AGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATTTCAGAAGC 3069 
οy	3070	GCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTTACCAAATAT 3129
QQ	2507	TCCACATTTAAAGGAGAAGCCAGTGACAACCTAAACATCACCGGCACCTTTACCAACAAC 2566
Qy Db	3130 2567	GGCACTGCCGAAATTAATAACACAAGGAGTGGTAAAACTTGGCAATGTTACCAAT 3186 
δλ	-	324
QQ	62	AAGGTGGTTTAAATATCACTACTAACGCCTCAGGCACTCAAAAAACCATTATTAACGGA 268
, oy	3247	GAFATAATCAACAAAAAGGAAGCTTAAATATTACAGACGAATAATAATGATGCTGAAATC 3306

qq	2687	AATATAACTAACGAAAAAGGCGACTTAAACATCAAGAATATTAAAGCCGACGCCGAAATC 2746
δλ	3307	CAAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACTCACGATTTCTTCCGATAAATT 3366
QQ	2747	CAAATTGGGGGCAATATCTCACAAAAAGAAGGCAATCTCACAATTTCTTCTGATAAAGT 2806
0y	3367	AATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGAGGACTCTAGTTCAGAT 3426
qq	2807	286
oy P	3427	GCGACAAGTAATGCCAACCTAACTATAAAACCAAAGAATTGAAATTGACAGAAGACCTA 3486
ò	8 4	354
Op	6	98
ογ	54	09
QO	2987	304
oy i	9	99
9 2	3667	AAAGAGTICAAAAATCICGAATGAGTGAAAGTAAAAAGTAAAAATGAAAAAGG 3100 TCTAGGAGGAAATGGGGAAGGAAAAGAAAAAGGAAAAAGGAATAACGGGTTAAACTATTAAT 3226
r qq	10	15
ΟY	3727	37
Dp	3155	GCAAAAGGTGAACGGTAACGTTACCTCCCACAACAATAAATA
Qy	3786	3785
qq	3215	GCAGCAGGAAATGTAACAACCAAAGAACACAACTATCAATGCAACCACAGGCAGG
Qy	3786	3785
QQ	3275	GAAGTAACTGCTCAAAATGGTACAATTAAAGGCAACATTACCTCGCAAAATGTAACAGTG 3334
Qy	3786	3785
QQ	3335	ACAGCAACAGAAAATCTTGTTACCACAGAGAATGCTGTCATTAATGCAACCAGCGGCACA 3394
Qy	3786	3785
qq	3395	GTAAACATTAGTACAAAAACAGGGGATATTAAAGGTGGAATTGAATCAACTTCCGGTAAT 3454
Οy	3786	3785
qq	3455	AAATATTAC
ΟŊ	3786	GTCGGAAAAGGTTACCACCACAGCAGGCTCGACCATTAACGCAACA 3831
Op	3515	ACAGTAACAGCGGATGCAGGAGCCTTGACAACTACAGCAGGCTCAACCATTAGTGCGACA 3574
Qy	3832	AATGGCAAAGCAATTACAACCAAAACAGGGGATACAGCGGTACG 3879
QQ	3575	ACAGGCAATGCAAATATTACAACCAAAACAGGTGATATCAACGGTAAAGTTGAATCCAGC 3634
Qy	3880	3888 1937 TTTCCGGT 3888
QQ	3635	TCCGGCTCTGTAACACTTGTTGCAACTGGAGCAACTCTTGCTGTAGGTAATATTTCAGGT 3694
Qy	3889	ō
QQ	3692	AACACTGTTACTATTACTGGGGATAGCGGTAAATTAACCTCCACAGTAGGTTCTACAATT 3754
ολ	4	0
qq	3755	AATGGGACTAATAGTGTAACCACCTCAAGCCAATCAGGCGATATTGAAGGTACAATT 3811

```
4606 AAACTTGGTGTAAGTGCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACA 4665
                                                                                                                                                                                                                                                                                                                                                                     4426 ACAGTAAATGGGTTAAATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGC 4485
                                                                                                                                         4246 ACCGTGGCAGGCTCGGATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAAGAT 4305
                                                                                                                                                    4306 GCTAAGCTAAATGGTGATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGC 4365
                                                                                                                                                                                       4366 GGCTCTGGTAGTGTGACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAAC 4425
            4066 GAAATTAATGCGACAGAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACT 4125
                                            4126 GAAGCCGGTTCTAGCATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGT 4185
                                                                              3932 CAAACAGGCTCTAGCATTACCTCAAGCAATGGTCAGACACTTTACAGCCAAGGATAGC 3991
4006 TCCGGTAATACGGTAAATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGCCGCA 4065
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4846 ACTGTGTGGGTTAAAGTTCAGTACGGGCTTTACCCCATCTTGTAAAAATTA 4896
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   pp
                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                   ŏ
                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                         QΩ
                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                           δ
                                                                                                                                                             qq
                                                                                                                                                                              οy
                                                                                                                                                                                               QΩ
                                                                                                                                                                                                               Óγ
```

Search completed: March 21, 2003, 21:15:19 Job time : 1049 secs



```
March 21, 2003, 20:56:36 ; Search time 156 Seconds (without alignments) 9705.533 Million cell updates/sec
                                                                                                                                                                                                                                                                                                                                   1 taaatatacaagataataaa.......tttaacaggttattattatg 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1: /cgn2_6/ptcdate/1/ina/5A_COMB.seq:*
2: /cgn2_6/ptcdate/1/ina/5B_COMB.seq:*
3: /cgn2_6/ptcdate/1/ina/6A_COMB.seq:*
4: /cgn2_6/ptcdate/1/ina/6B_COMB.seq:*
5: /cgn2_6/ptcdate/1/ina/PtcTUS_COMB.seq:*
6: /cgn2_6/ptcdate/1/ina/ptcTUS_COMB.seq:*
GenCore version 5.1.4\_p5\_4578 Copyright (c) 1993 - 2003 Compugen Ltd.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Total number of hits satisfying chosen parameters:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         441362 seqs, 153338381 residues
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries
                                                                                                                OM nucleic - nucleic search, using sw model
                                                                                                                                                                                                                                                                                                                                                                                         IDENTITY_NUC
Gapop 10.0 , Gapext 1.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Issued_Patents_NA:*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Minimum DB seq length: 0
Maximum DB seq length: 200000000
                                                                                                                                                                                                                                                                                US-10-092-880-3
                                                                                                                                                                                                                                                                                                                                                                                         Scoring table:
                                                                                                                                                                                                                                                                                                                Perfect score:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Database :
                                                                                                                                                                                                                                                                                                                                         Sequence:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Searched:
```

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

	1	Appli	Appli	Appli	Appli	Appli	Appli	Appli	Appl	Appli	App1i	Appli	Appli	Appli	Appli	Appli	Appl A	Appli	Appli	Appli	Appli	Appli	Appli	Appli	, Appl	Appli	Appli	Appli
	٠.	3,	θ,	3	3,	3,	3,	ω,	70,	6,	é,	9	9	ý	ģ	ý	72,	Ļ	Ĥ	'n	ì	1,	Ţ,	1,	99	ď,	5,	ď,
<u></u>	Description	Sequence	Sequence				Sequence	Seguence	Sednence	Sedneuce	Sednence	Seguence	Sednence	Seguence	Seguence	Sequence	Sequence	Sequence	Seguence	Sequence	Sequence	Sequence	Sequence	Sequence	Sednence	Sednence	Sequence	Sednence
×	< C	12.	7	, _	2	2	<u>/</u>	_	_																			
	C	-08-038-682-3	-302-832-	겉	4	-728-4	-617-69	-719-64	9-206-9	3-038-682-	÷	-530-198-	8-469-	8-728-4	8-617-6	08-719-6	9-206-	08-038-	90	08-530-198-1	08-469	3-728-	08-617-	08-719-	09-206-942-	-038-68	-302-83	08-530-198-5
•	ID	ns-(	ns-(	ns-(	ns-	ns-	ns-	ns-	ns-0	ns-	0-SD	us-	ns-0	ns-0	ns-0	ns-	O-SD	ns-	ns-	ns-	-Sn	30-SD	us-	ns-	-Sn	US-	-Sn	-SD
	DB	7				7		4	4	٦				7		Ī	•	Н						4	4	Н	٦	7
	Length	4937	4937	4937	4937	4937	4937	4937	4937	9323	9323	9323	9323	9323	9323	9323	3108	5116	5116	5116	5116	5116	5116	5116	11	9171	9171	9171
æ	Query Match	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	97.6	97.6	97.6		97.6	97.6	٠,	63.0	54.3	54.3	54.3	54.3	54.3	54.	54.		52.	52.0	
	Score	4937	4937	4937	4937	4937	4937	4937	4937	4820.2	4820.2	4820.2	4820.2	4820.2	4820.2	4820.2	3108	2680.2	2680.2	2680.2	2680.2	2680.2	2680.2	2680.2	2680.2	2567	2567	2567
	Result	1	7	m	4	2	9	7	8	6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27

Sequence 5, Appli	Sequence 5, Appli	Sequence 5, Appli	Sequence 5, Appli	Sequence 8, Appli	Sequence 7, Appli	Sequence 52, Appl	Sequence 50, Appl	Sequence 46, Appl	Sequence 58, Appl	Sequence 48, Appl	Sequence 60, Appl						
US-08-469-880-5	US-08-728-470-5	US-08-617-697-5	US-08-719-641-5	US-08-617-697-8	US-08-038-682-8	US-08-302-832-8	US-08-530-198-8	US-08-469-880-8	US-08-728-470-8	US-08-719-641-8	US-08-617-697-7	US-09-206-942-52	US-09-206-942-50	US-09-206-942-46	US-09-206-942-58	US-09-206-942-48	US-09-206-942-60
7	7	7	4	7	Н	Н	7	7	~	4	7	4	4	4	4	4	4
9171	9171	9171	9171	4803	4702	4702	4702	4702	4702	4702	4794	2934	2952	3240	2997	3222	2979
52.0	52.0	52.0	52.0	45.5	44.6	44.6	44.6	44.6	44.6	44.6	40.0	32.2	32.2	30.4	30.3	30.1	30.0
2567	2567	2567	2567	2246.6	2202.2	2202.2	2202.2	2202.2	2202.2	2202.2	1974	1591.8	1591.8	1500.8	1497.6	1484.4	1481 2
	a	0	_	32	3	4	ហ	9	7	ω	39	0	_	7	m	4	ď

## ALIGNMENTS

```
RESULT 1

US-08-038-682-3

US-08-038-682-3

Sequence 3, Application US/08038682

Sequence 3, Application US/08038682

Sequence 3, Application US/08038682

GENERAL INFORMATION:

MUMBER OF SEQUENCES:

ITITE OF INVENTION:

FINE OF INVENTION:

STREET:

SOUNTRY:

ALIDIAGORAL STREET:

STREET:

SOUNTRY:

ALIDIAGORAL STREET:

COUNTRY:

ALIDIAGORAL STREET:

COUNTRY:

ALIDIAGORAL STREET:

COUNTRY:

ALIDIAGORAL STREET:

COUNTRY:

COU
```

0

120	180	240	300	360			540	009	660	720	8 8	4 4	006	9	1020	1080	14
CACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCGGCATATAA 	AATGGTATAARCTTTCATCTTTCATCTTTAATCTTTCATCA	CTITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTIT 	CACATGAAATGAACCGAGGGAAGGGAGGGAGGGGCAAGAATGAAGAGGGGGCTGAAC 	GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAG 	ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGATTGGCATGCTTTGTTTG	CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 	CACTTAGGGTTAAAGCCACTTTCGGCTATGTTACTATCTTTAGGTGTAACATCTATTCGA 	CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 	CAAGTAGATGGTAATAAAACCATTATCGGAACAGTGTTGACGCTATCATTAATTGGAAA 	CAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC 	GATTTAGATTCTAA( 	SCAATTATTAA 	CTAATGGCTTTAC 	TOACCTTCGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAGATCACGGTTTA 	CTGTCGGTAAAGACGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGG 	ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACCATCAGCGAT	AGCGGTCAATCTG
61	121	181	241	301	361	421	481	541	601	661	721 (	781 (	841 A 841 A	901 T   901 T	961 A   961 A	1021 A	1081 A       1081 A
Ογ	Oy Dp	5 G	\$ g	Oy Dp	Oy Dp	Qy Db	Ολ Db	Oy Db	og Og	Oy Dp	Qy Dp	Oy Dp	Qy Db	Oy Db	δς O	0y .	Oy 1

```
1201 GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 1260
                                                                           1141 GGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTGGAAACCAA 1200
                                                                                                                   1261 AAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 1320
                                                                                                                                  1321 GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1380
                                                                                                                                                                                                1381 TCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACGAGCGCGGCGAAGGTAAAAAC 1440
                                                                                                                                                                                                                                                    1441 GGCATTCAATTAGCAAAGAAACCTCTTTAGAAAAGGCTCAACCATCAATGTATCAGGC 1500
                                                                                                                                                                                                                                                                                                              1501 AAAGAAAAAGGCGGACGCGTATTGTGGGGGGGGATATTGCGTTAATTGACGGCAATATT 1560
                                                                                                                                                                                                                                                                                                                                                                                    1501 AAAGAAAAAGGGGGACGCGTATTGTGTGGGGGGGATATTGCGTTAATTGACGGCAATATT 1560
                                                                                                                                                                                                                                                                                                                                                                                                                1561 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT 1620
                                                                                                                                                                                                                                                                                                                                                                                                                                  1621 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1681 GATGTAACAATTGAAGCCGGAAGACCCCCTTCGCAATAATACGGGTATAAATGATGATTC 1740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1741 CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAATAGCGAACTCAAAACAACGCTA 1800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1801 ACCAATACAACTATTTCAAATTATCTGAAAAAGGCCTGGACAATGAATATAACGGCATCA 1860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1861 AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT 1920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1981 AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 2040
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1921 AGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAAGGCGGA 1980
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1981 AATTIAACCATITATTCIGGCGGAIGGGIIGAIGTICAIAAAAATAITACGCIIGAICAG 2040
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             2041 GGTTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 2100
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               2041 GGTTTTTAAATATTACCGCCGTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 2100
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      2101 GACGCGGCAAATGCTAAAATTGTCGCCCAGGGCACTGTAACCATTACAGGAGGGAAAA 2160
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       2161 GATTICAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTCA 2220
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2221 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280
                                                                                                                                               qq
                                                                                                                  ò
                                                                                                                                                                            δy
                                                                                                                                                                                                       Op
                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                   q
                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             οq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ô
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
```

Э

2280	2340	46	2520	2580	2640	2700	2760 2760	2820 2820	2880	2940	3000	3060	3120 3120	3180 3180	3240 3240	3300	3360
	ACCARACTACA GAAAAAACACCTCGTATTGGCAAACCAGCCATGATTGGCACT STCAGTGCTCTTAAATCTAGAGACAGGGGCAAATTTACCTTTATTAAATACATTT	SICAGIGCICTIANAICTAGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAÁGTTAATTTCAAATTAAAA 	CCAAACGAGAACATGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA	GCCACTGGGGGGGCTCTGTTTTTTGATATATAGCCAACCATTCTGGCAGAGGGGCT 	GAGTTAAAAATGAGTGAAATTAATATCTCTAACGCGCTAATTTTACCTTAAATTCCCAT	GTTCGCGGCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCA 	AATTTCAGCCTCAGACAGACGAAAGATGATTTTTATGACGGGTACGCACGC	AATTCAACCTACAAATCCATTCTGGGGGGTAATGTCACCCTTGGTGGACAAAACTCA 	AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 	- AATAACGCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC 	GTTAATGGGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT	1 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTT	1 ACCAATAATGGCACTGCCGAAATTAATATAACACAGGAGTGGTAAAACTTGGCAATGTT 	1 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAC	1 GGCGGAGATATAATCAACAAAAAGGAAGCTTAAATATTACAGACAG	1 GAAATCCAAATTGGGGGGAATATCTCGCAAAAAGAAGGCAACCTCACGATTCTTCCGAT
2221 2281	34	2401	2461	2521	2581	2641	2701	2761	2821	2881	2941	3001	3061	3123	318	324	330
ga V	Oy Oy	03 A	Qy	Qy	Qy	Qy	Qy Db	Qy Dp	oy Op	yo da.	Qy	Qy	Oy Dp	QY Dp	Qy Dp	Qy	OY

3301 GAAATCCAAATTGGGGGAATATCTCGCAAAAAGAAGGCAACCTCAGGATTCTTCCGAT 3360 3361 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGAGGAGGÅCTCTAGT 3420 111111111111111111111111111111111111	TATTAAAACCAAAGAATTGAAATTGACAGAA 348 	AGTATTTCAGGTTTCAATAAAGCAGAGATTA 	41 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 36 	31 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGG 36 	661 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3 	3721 ATTACTGCAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC 37 	3781 ACCGCGTCGGAAAAGGTTACCACCACAGCAGGCTCGACCATTAACGCAACAAATGGCAAA 38	3841 GCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAAGT 39	3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 39 	3961	4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 408 	4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATA	4141 ATCACTTCAACTAAGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 420	4201 ATTAATGCTGCTAATGTGACATTAAATAC 	4261 GATATTAAAGCAACCAGGGGCACCTTGGTTATTAACG	4321 GATGCATCAGGTGATAGTACAGAP 	4381 ACTGCGGCAACCTCAAGCAGTGTGAATAT
Db 3	Oy 3	Qy 3 Db 3	Qy 3	Qy Db	Oy	Oy Db	QQ Dp	QQ Dp	Qy	Qy	Oy Db	QY	Qy	Qy	QY	Qy	Oy i

ö

q

Op οy g ò g δ

```
4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                                                               4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGAAGT 4620
                                                                                                                                                                     4681 ACCAGACCGICAAGICAAGIGAIAATIICIGAAGGIAAGGCGIGIIICICAAGIGGIAAI 4740
                                                                                                                                                                                                                        4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                              4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                                                                                                                                              4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4861 GTICAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4861 GITCAGTACGGGCTITACCCATCTTGFAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
TITLE OF INVENTION: of No. 5603938-Typeable Haemophilus
NUMBER OF SEQUENCES: 8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       SOFTWARE: Patentin Release #1.0, Version #1.30 CURRENT APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        APPLICATION NUMBER: US pct/us93/02166 FILING DATE: 16-MAR-1993 ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 16-SEP-1994 N: 435
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    APPLICATION NUMBER: GB 9205704.1
FILING DATE: 16-MAR-1992
PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              E: Floppy disk
IBM PC compatible
SYSTEM: PC-DOS/MS-DOS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Sequence 3, Application US/08302832 Patent No. 5603938
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                COMPUTER READABLE FORM:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               APPLICATION NUMBER:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       OPERATING SYSTEM:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Arlington
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          COUNTRY: U.S.A. ZIP: 22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                CLASSIFICATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              MEDIUM TYPE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               FILING DATE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        COMPUTER:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               US-08-302-832-3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     STREET:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         STATE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               RESULT 2
```

a

δ

ò

g ά

```
61 CACCITITITGCAGICTATATGCAAATATITITAAAAAATAGTATAAATCCGCCATATAA 120
                                                                                                                                                                                                                                                                     181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT 240
                                                                                                                                                                                                                                                                                                                                                                     241 CACATGAAATGAACCGAGGGAAGGGAGGGGGGCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                     301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   421 CGGGGTTGTGACCATTCCACAGAAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACTACAGGGACAGCCACTATG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                661 CAATTTAACATGGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC 720
                                                                                                                                                                                        0; Gaps
                                                                                                                                                                                                                        721 GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               781 GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Query Match 100.0%; Score 4937; DB 1; Length 4937; Best Local Similarity 100.0%; Pred. No. 0; Matches 4937; Conservative 0; Mismatches 0; Indels 0;
REFERENCE/DOCKET NUMBER: 1038-404
             TELECOMMUNICATION INFORMATION:
                       TELEPHONE: (703) 415-0810
TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 3:
SEQUENCE CHARACTERISTICS:
                                                                                                                       MOLECULE TYPE: DNA (genomic)
                                                                       LENGTH: 4937 base pairs
TYPE: nucleic acid
                                                                                                  single
                                                                                                             linear
                                                                                               STRANDEDNESS:
                                                                                                             TOPOLOGY:
                                                                                                                                   US-08-302-832-3
                                                                                                                                                            Query Match
                                                                                                                                                                                                           δλ
                                                                                                                                                                                                                                                          δλ
                                                                                                                                                                                                                                                                                q
                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                        ŏ
                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   á
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          рp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
```

Ŋ

òγ

2881 AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 2940 2941 AATAACGCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC 3000 3001 GTTAATGGGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT 3060 2941 AATAACGCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC 3000 2460 2640 2700 2281 ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 2340 2341 AACGICAGIGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTAITAAATACATTCA 2400 2460 2520 2521 CCAAACGAGAACATGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 2580 2701 GTTCGCGGCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCA 2760 TCAGTGAATAATTTAACCCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280 1981 AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAATTTACGCTTGATCAG 2040 1981 AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATTATACGCTTGATCAG 2040 2041 GGTTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 2100 2101 GACGCGGCAAATGCTAAAATTGTCGCCCAGGGCACTGTAACCATTACAGGAGAGGGAAAA 2160 GATTICAGGGCTAACAACGTATCTITAAACGGAACGGGTAAAGGTCTGAATATCATTTCA 2220 2881 AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 2581 GCCACTGGTGGGGGCTCTGTTTTTTTGATATATATGCCAACCATTCTGGCAGAGGGGCT 2641 GAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT 2401 AGCAATAGCAAAGGCTTAACAACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 2461 GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAAATTTCAAATTAAAA 2401 AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 2161 2221 qq qq qq δ Db òχ g òγ a ò ŏ οg δy Pp δy QQ Ω qq Óλ ДQ Ωp òγ g ò ρp PP òγ Pρ Ω qqδy QΥ Ω

```
3001 GITAATGGGAGTITAAGITTAACTGGGGGAAATGCAGATATTAAAGGCAATCICACTATT 3060
                         3061 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTT 3120
                                         3121 ACCAATAATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGCAATGTT 3180
                                                                                             3181 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC 3240
                                                                                                                                               3301 GAAATCCAAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT 3360
                                                                                                                                                                                                                                                      3361 AAAATTAATATCACCAAACAGATAACAATCAAAAGGGTATTGATGGAGGGACTCTAGT 3420
                                                                                                                                                                                                                                                                                                      3421 TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA 3480
                                                                                                                                                                                                                                                                                                                                                           3481 GACCTAAGTATTICAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 3540
                                                                                                                                                                                                                                                                                                                                                                                                             3541 ACTATIGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAATTTAAC 3600
                                                                                                                                                                                                                                                                                                                                                                                                                                                               3601 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACATAATAGCAAAGTG 3660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    3661 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGGGACAACGATACCGGCTTAACT 3720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               3661 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        3721 ATTACTGCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC 3780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       3781 ACCGCGTCGGAAAAGGTTACCACCACAGCAGGCTCGACCATTAACGCAACAAATGGCAAA 3840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          3841 GCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAAGT 3900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAATTGAAGCGAAATCGGGT 3960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               3901 GITAGCGCGACIGGIGAITTAACCACTAAAICCGGCTCAAAAATIGAAGCGAAATCGGGT 3960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAAAATTAATGCGACA 4080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                               δ
                                                                                                     g
                                                                                                                                à
                                                                                                                                                           qq
                                                                                                                                                                                   ŏ
                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                      ŏ
                                                                                                                                                                                                                                                                                         õ
                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                            ð
                                                                                                                                                                                                                                                                                                                                                                    셤
                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         O
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ô
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             á
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ð
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
```

```
4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
               4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                           4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                            4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                                                                               4261 GATATTAAAGCAACCAGGGGACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                       4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGATAAATGGGTTA 4440
                                                                                                                                                                                                                                                                                               4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500
                                                                                                                                                                                                                                                                                                               4501 AAATATATCCAGCCAGGTGTAGCAAGTGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                                                                                                                                                                                                                                                                                                                                        4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                                                                                  4621 GCTGTACGTTTTGTTGAGCCAAATAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4681 ACCAGACCGTCAAGTCAAGTGATATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4801 GTAGATTICATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     4861 GTTCAGTACGGGCTTTACCCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                APPLICANT: BARENKAMP, STEPHEN J
APPLICANT: ST. GEME III, JOSEPH W
TITLE OF INVENTION: HIGH MOLECULAR WEIGHT SURFACE PROTEINS
TITLE OF INVENTION: OF NON-TYPEABLE HAEMOPHILUS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ADDRESSEE: Shoemaker and Mattare, Ltd
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Sequence 3, Application US/08530198 Patent No. 5869065
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4921 AACAGGTTATTATTG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      NUMBER OF SEQUENCES:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Arlington
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ADDRESSEE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            US-08-530-198-3
 ò
                            q
                                                                                    q
                                                                                                                    δ
                                                                                                                                                 qq
                                                                                                                                                                            δλ
                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                     δy
                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                                                                       ô
                                                                                                                                                                                                                                                                                                                                                                                                                ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                           QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ά
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ô
```

```
QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ōλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                             QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 òγ
                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                δŏ
                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                        δy
                                                                                                                                                                                     g
                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                               В
                                                                                                                                                                                                                                                                                                     δλ
                           Óλ
                                                 Пр
                                                                        δλ
                                                                                            Ω
                                                                                                                    δ
                                                                                                                                        Пр
                                                                                                                                                                òγ
                                                                                                                                                                                                             QΥ
                                                                                                                                                                                                                                                                                                                                        ;
0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   481 CACTTAGCGTTAAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   421 CGGGGTTGTGACCATTCCACAGAAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCCACTATG 600
                                                                                                                                                                                                                                                                                                                                                                                                        181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGGCAAGAATGAAGAGGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT 240
                                                                                                                                                                                                                                                                                                                                                            0; Gaps
                                                                                                                                                                                                                                                                                                               100.0%; Score 4937; DB 2; Length 4937; 100.0%; Pred. No. 0; tive 0; Mismatches 0; Indels 0;
                                                                SYSTEM: PC-DOS/MS-DOS
PatentIn Release #1.0, Version #1.25
                                                                                            CORRENT AFFLICATION DATA:

PELLICATION NUMBER: US/08/530,198
FILING DATE: 13-DEC-1995
CLASSIFICATION: 424
ATTORNEY/AGENT INFORMATION:
NAME: BERKEYRESSEN, JERRY W
REGISTRATION NUMBER: 22.651
REFERENCE/DOCKET NUMBER: JWB-1186
TELEPHONE: (703) 415-0810
TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 3: SEQUENCE CHARACTERISTICS:
LENGTH: 4937 base pairs
                                                   COMPUTER: IBM PC compatible OPERATING SYSTEM: PC-DOS/MS-
                                                                                                                                                                                                                                                                         TOPOLOGY: linear
MOLECULE TYPE: DNA (genomic)
                                           Floppy disk
                                                                                                                                                                                                                                                                                                                                          Conservative
                                                                                      CURRENT APPLICATION DATA:
APPLICATION NUMBER: US
                                                                                                                                                                                                                                                              single
                               COMPUTER READABLE FORM: MEDIUM TYPE: Floppy
                                                                                                                                                                                                                                                  nucleic acid
                                                                                                                                                                                                                                                                                                                                Similarity
Virginia
           Y: U.S.A.
22202-0286
                                                                                                                                                                                                                                                             STRANDEDNESS:
                                                                                                                                                                                                                                                                                                                                           Matches 4937;
                                                                                                                                                                                                                                                                                       ; MOLECULE TY
US-08-530-198-3
          COUNTRY:
                                                                                                                                                                                                                                                                                                                       Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ΩŅ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                   ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ŏ
                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                       q
                                                                                                                                                                                                                                                                                                                                                                                                             ò
```

1621 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680 1681 GATGTAACAATTGAAGCCGAAGACCCCTTCGCAATAATACCGGTATAAATGATGAATTC 1740 1621 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680 1381 TCAGGTAAAGAAGGGGAGAAACTTACCTTGGCGGTGACGAGCGCGGCGAAGGTAAAAAC 1440 1381 TCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACGAGGCGCGGCGAAGGTAAAAAC 1440 1441 GGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC 1500 1501 AAAGAAAAAGGCGGACGCGCTATTGTGTGGGGGGGATATTGCGTTAATTGACGGCAATATT 1560 1561 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGGAT 1620 1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATCTG 1140 1141 GGCGATATTTTGCCAAAGGCGGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA 1200 1021 ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGCCAAAAAATCACCATCAGCGAT 1080 961 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGTGTG 1020 781 GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840 841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900 661 CAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC 720 721 GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780 901 TTCACCTTCGAGCAAACCAAAGATAAAAGCGCTCGCTGAAATTGTGAATCACGGTTTAATT

GATGAATTC 1740	CAACGCTA 18	AACGCCATCA 1860               AACGCCATCA 1860	CTCCAT 19:	3GGA 198       GGA 198	GATCAG 204 	GCACGC 210          GCACGC 210	AGGGAAAA 216          AGGGAAAA 216	TCATTTCA 2220           TCATTTCA 2220	GAATATAACA 2280               GAATATAACA 2280	CGCACTGG 2340             CGCACTGG 2340	ACATTTCA 2400           ACATTTCA 2400	TTAACGGC 2460            TAACGGC 2460	AATTAAAA 2520         AATTAAAA 2520	AATATCACA 2580           AATATCACA 2580	SGGCT 20	TTCCCAT 2700           TTCCCAT 2700	CAATTCA 2760           CAATTCA 2760	GCCATC 282
CAATAATACCGGTATAAATG	AATAGCGAACTCAAA 	ATGAATAT             ATGAATAT	ACTCCCACTI 	ATGGAGATATTACTTC 	ATATTAC             ATATTAC	TTGAAGGTGGAAATAACAAA 	CTGTAACCATTACAGGAG 	CGGGTAAAGGTCTGAATAT 	CACAATTAACATATCTGGGAI 	GGCAAACCAGCCATGATT 	ATTTACCTTTATTAAAT 	TCTGCAGGGTGAATT 	GCGA     GCGA	GTTTTTAGCC                 GTTTTTAGCC		5 = 5	ACCATAAATGCAAC 	GGGTACGCACGCAA 
AAGCCGAAGACCCCCTTCGC#	TGAAGCAAGCGACCO	TTCAAATTATCTGA/                   TCAAATTATCTGA/	TAATAGCTCAATCAACATC 	GGGGGGGTTCAGATTG 	CTGGCGGATGGGTTGAT 	ACCGCCGCTTCCGTAGCTT 	NTTGTCGCCCAGGGCA	AACAACGTATCTTTAAACGGAACG 	CCACAATCTTAGTGG 	ACGAGAAAGAACACCTCGTATTC 	AATCTAGAGACAGGC 	CTTAACAACACAGTATAGAAGC 	AGAAGO           AGAAGO	rgaacacaagcaaacctttaccaattg 	TTGATATAT            TTGATATAT	3AAATTAATATCTCTAACG 	GCTTTTAAAATCAACAAAGACTTA 	'CAGACAGACGAAAGATGATTTTA' 
GATGTAACAATTG	CCAACAGGCACCGG' 	ACCAATACAACTAT	AGAAAACTTACCGT"                    AGAAACTTACCGT"	AGTAAAGGTCAGCGT(                   AGTAAAGGTCAGCGT(	AATTTAACCATTTATT 	GGTTTTTAAATATT 	GACGCGCAAATGCT	GATTTCAGGGCTAAC	TCAGTGAATAATTTAACC	ATTAACCAAACTACG	AACGTCAGTGCTCTT/ 	AGCAATAGCAAAGGC 	GTAAATGGCAACATG 	CCAAACGAGAACATG 	GCCACTGGTGGGGGC 	GAGTTAAAAATGAGTC 	GTTCGCGGCGATGACGC 	AATTTCAGCCTCAGA( 
1681	1741	1801	1861	1921	1981	2041	2101	2161	2221	2281	2341	2401	2461 (2461 (	2521 (	2581 ( 2581 (	2641 ( 2641 (	2701 G	61
qq	Qy Db	Oy Dp	QV	Qy	Qy Db	Qy Dp	Oy Op	Oy Dp	Oy Dp	Oy Db	Qy Db	Qy Db	Oy Db	Qy Db	Qy Db	Qy Db	Oy Dp	ζα

```
2821 AATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCA 2880
             2881 AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 2940
                                                                                                                                     3001 GTTAATGGGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT 3060
                                                                                                                                                                  3061 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACGGGCAATTTT 3120
                                                                                                                                                                                                          3121 ACCAATAATGGCACTGCCGAAATTAATAACACAAGGAGTGGTAAAACTTGGCAATGTT 3180
                                                                                                                                                                                                                              3121 ACCAATAATGGCACTGCCGAAATTAATAAACACAAGGAGTGGTAAAACTTGGCAATGTT 3180
                                                                                                                                                                                                                                                  3181 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC 3240
                                                                                                                                                                                                                                                                                          3301 GAAATCCAAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT 3360
                                                                                                                                                                                                                                                                                                                                                3361 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGAGGACTCTAGT 3420
                                                                                                                                                                                                                                                                                                                                                                                        3421 TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA 3480
                                                                                                                                                                                                                                                                                                                                                                                                                                  3481 GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 3540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         3541 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 3601 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 3660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          3661 AAAACATCTAGCAGCAATGGGGACGTGAAAGCAATAGGGACAAAGGATACCGGCTTAACT 3720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               3721 ATTACTGCAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC 3780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        3781 ACCGCGTCGGAAAAGGTTACCACACAGCAGGCTCGACCATTAACGCAACAATGGCAAA 3840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 3601
                   Op
                                                           OD
                                                                                  δ
                                                                                                    Db
                                                                                                                         ò
                                                                                                                                            qq
                                                                                                                                                                δλ
                                                                                                                                                                                    QQ
                                                                                                                                                                                                                            QQ
                                                                                                                                                                                                                                                                     Op
                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                         δ
                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                           δy
                                                                                                                                                                                                                                                                                                                                                                                              pp
                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Вþ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
```

σ

```
4501 AAATATATCCAGCCAGCGAGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4741 GGGGACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                                                  4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440
                                                                                                                                                                                                                                                                                                                                                                             4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
             4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                                                                                           4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                                                                                                                           4261 GATATTAAAGCAACCAGGGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                       GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                                                                                                                                                                                                                                                                                            4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500
3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960
                                            3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                       AATGTTACGGCAAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4681
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4861
                                                                                                                                                                                                                                                                                                                        4321
                                                                                           4021
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                               QΥ
                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                 QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    οy
                                                                                                                                                                                                      Dp
                                                                                                                                                                                                                                                   QQ
                                                                                                                                                                                                                                                                         òγ
                                                                                                                                                                                                                                                                                                 pp
                                                                                                                                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                                                                                                                           Dp
                                                                                                             QQ
                                                                                                                                      οχ
                                                                                                                                                         g
                                                                                                                                                                                   δ
                                                                                                                                                                                                                              οy
                                                                   g
                                                                                         δ
```

```
241 CACATGAAATGAACCGAGGGAAGGGAGGGAGGGGAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTTCATCTTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     61 CACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  100.0%; Score 4937; DB 2; Length 4937; 100.0%; Pred. No. 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            .;
0
                                                                                                                                                                    APPLICANT: Barenkamp, Stephen J. TITLE OF INVENTION: High Molecular Weight Surface Proteins TITLE OF INVENTION: of No. 5876733-Typeable Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Indels
                                                                                                                                                                                                                                                                                                               ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   COMPUTER: Floppy disk
COMPUTER: IBM PC compatible
OPERATING SYSTEM: PC-DOS/MS-DOS
SOFTWARE: PatentIn Release #1.0, Version #1.30
CURRENT APPLICATION DATA:
APPLICATION NUMBER: US/08/469,880
FLING APPLE 047-100: 435
PRIOR APPLICATION: 435
PRIOR APPLICATION: 435
APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLICATION: APPLI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ;
0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1038-516 MIS:vg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     0; Mismatches
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PRIOR APPLICATION DATA:
PRIOR APPLICATION NUMBER: GB 9205704.1
APPLICATION NUMBER: GB 9205704.1
FILING DATE: 16-MAR11992
APPLICATION NUMBER: US PCT/US93/02166
FILING DATE: 16-MAR-1993
PRIOR APPLICATION DATA:
APPLICATION NUMBER: US 08/302,832
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           APPLICATION NUMBER: US 08/302,832 FILING DATE: 16-SEP-1994 ATTORREY AGENT INFORMATION:
                                                            Sequence 3, Application US/08469880 Patent No. 5876733
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         REFERENCE/DOCKET NUMBER: 10.
TELECOMMUNICATION INFORMATION:
TELEPHONE: (703) 415-0810
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           TELEFAX: (703) 415-0813
INPORMATION FOR SEQ ID NO: 3: SEQUENCE CHARACTERISTICS:
LENGTH: 4937 base pairs
TYPE: nucleic acid
STRANDEDNESS: sincle
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   MOLECULE TYPE: DNA (genomic)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Conservative
                                                                                                                                                                                                                                                                                     NUMBER OF SEQUENCES: 8
CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Arlington
Virginia
                                                                                                                                      GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Matches 4937;
                                  US-08-469-880-3
                                                                                                                                                                                 APPLICANT:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    CITY: 2
STATE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Local
RESULT 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δy
```

ö

	60	20	80			09	20	80		0 0	0 0	20	80	40	00	09	20	
GAAC	CAAG 3	GGCA 4 1111 GGCA 4	TAAC 4	25 – 57 1 – 57	(2 - (2	GAAA 6	CGCC 7:	AAC 7	AAC 8,	GTAAT 90         GTAAT 90	ATT 96      ATT 96	GTG 10     GTG 10	GAT 10	CTG 11      	CAA 12         	GCC 12         	3GC 13	H H
SGAGC	TATGAA	TGAATT        TGAATT	TAGGTGT/         TAGGTGT/	CTAT	SCCAC 	AATTG	AACTO	AGATTCT	AATTATT 	0,-0	GGTTTAAT	GAGGGT        GAGGGT	CATCAGO             CATCAGO	GTCAAT         GTCAAT	CGAAAC         CGAAAC	CTTTCC	GCTAAAGO             GCTAAAGO	SAC
AC:	GAGAAAAT            GAGAAAAT	TGTGTC        TGTGTC	TATCTTI	E - E	8 - 8	CTATCATTA              CTATCATTA	AAACAACA          NAACAACA	TTI	)     	ATCAAGGCC	GAATCACC	GAAAAACG 	AC - S	GAAGCG          GAAGCG	ACTATT            ACTATT	ATTGTT       ATTGTT	AGCAA 11111	11.
AAGAA	CTTAG	GGTTGCTC	TGTTAC:          TGTTAC:	TTTAGGT(         TTTAGGT(	AGTAC 	rgacg       rgacg	rttacaagaaaaca                    rttacaagaaaaca	AAAAGGG               AAAAGGG	AGGTAAAGP 	GAAAAC	AAATTGTG 	CAAAGTC	SCAAAAATC 	GAAAATO            GAAAATO	SCTGCC	GGCAATATTG               GGCAATATTG	CAAAAT	£ — £
99	AACTAACC	TGCTTT	CCGCTATC	ACTATC 	SGATGT 	CAACAGTGT           CAACAGTGT	CAGTTTTT.	CCCAATTAAAAGGGAT 	ACAAT 	TTCTAACGAAAACATC 	CGCTGA/           CGCTGA/	TGGTGGC                   TGGTGGC	CGCAGGG         CGCAGGG	GCGCCTG1	GTCCGT(	AAAAGC            AAAAGC	rcccr 	TTAAAAACAGG                  TTAAAAACAGG
SGAGG	TIGHTC	GCCTGAAT 	AAGGCTT 	GCTATGTT,             GCTATGTT,	AGGAATO         AGGAATO	<u> </u>	3GTG	CAAATCTC 	TGGTATCA           TGGTATCA	SCTAGACATTI 	AAAGCGCT(             AAAGCGCT(	CTTAT 	TTTACTO             TTTACTO	CATTGCC	AACATTAATGTO	AAGCAAAGATI 	GTAATT	GTCACATS               GTCACATS
SGGAA	TTAA	CAAAC	CAGAAAAAG                 CAGAAAAAAAAAAA	11100	GGCTTACAAGG	raaaccattatc 	TGAAATC          TGAAATC	raac        raac	CCCAAA	TACC	SAT	TGTAAATC          TGTAAATC	ATTTC	PACAG	CGGTAAC	5-5	TGGCGGT(           TGGCGGT(	CGATAAAC           CGATAAAC
555	AIAAAGIAA 	AAATTCAG	CATTCCA(            CATTCCA(	TTAAAGCCACT	AGCAAGCGC	AATAAAAC              AATAAAAC	ACCAAAATG	TACATC	FAATCAACCCAAATG 	SGCTTC	AAACCAAAC	CGGCAGTC	GTGGCAGC 	CATTACTI 	CAAAGG             CAAAGG	TGATTCT(          TGATTCT(	GGAAATT            GGAAATT	ATTACAGGC
AATG	AATG	GTCTC	GTGAC        GTGAC	8 - 8	1111	ATGGT        ATGGT	ACATCGAC              ACATCGAC	ACCGTGTJ                   ACCGTGTJ	CTTTT	GCTTTAC                CTTTAC	TCGAGCA           TCGAGCA	GGTAAAGACGGC                  GTAAAGACGGC	AAATG        AAATG	CCAAC	TTTTGC        TTTTGC	TTCTGC        TTCTGC	TGAAGC        TGAAGC	SATG  - -  SATG
T.A.	GAACGCA	TATATC 	11111 11111	CACTTAGG             CACTTAGG	AATCTG	AAGTAG           AAGTAG	AATTTAAC            AATTTAAC	TATTCAA(          TATTCAA(	GACAAGT          GACAAGT	ACTAATG(	TCACCT1          TCACCT1	ACTGTCGC 	TTAGCGT	ATAATAAAC             ATAATAAAC	CGATAT 	GTAAACT           GTAAACT	AAAGAGGG 	CAAGCT( 
241 0	01	361 A	421 C       421 C	481 C 481 C	541 C 1 541 C	601 C	661 C	721 GT.    721 GT	781 G( 1 781 G(	841 AC       841 AC	901 TT 	961 AC    961 AC	1021 AT       1021 AT	1081 AT   1   1	1141 GG        141 GG	201 G 201 G	261 261	321 GG    321 GG
qa o	QQ Dp	Qy Dp	Oy Dp	Qy	Oy Dp	Qy	Qy Dp	Ογ Db	Qy Dp	Qy Dp	Qy	Qy Db	oy do	Oy Ob	Qy 1	Qy 1 Db 1	Qy 1 Db 1	Oy 1 Db 1

541   1   1   1   1   1   1   1   1   1		TG 366 	CT 372	TC 378      TC 378	AA 384( 	GT 3900 11 GT 390	GCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960 	TA 402	TTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080 	GC 414 	900 4 000 4	CG 42	GT 432    1   432	TG 43	4 + 4 + 4 + 4 + 4	TG 4	4 TT	GT 4	тъсстттстпавсковавтаватасваттасвстсватасванасвантться 4680
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		AATGTTAAAGATTCAA 	AAAACATCTAGCAGCI	ATTACTGCAAAAAAT( 	ACCGCGTCGGAAAAGC	GCAAGTATTACAACCA	GTTAGCGCGACTGGT 	GAGGCTAATGTAACAI 	AATGTTACGGCAAAC	GAAGGAGCTGCAACC	ATCACTTCAACTAAG	ATTAATGCTGCTAAT	GATATTAAAGCAACC	GATGCATCAGGTGAT	ACTGCGGCAACCTCA 	AATATCATTTCGAAA 	AAATATATCCAGCCA 	GAAAAAGTAAAAGAT 	GCTGTACGTTTTGTT
	54	60	99	72	78	84 84	90	96	02	80	14	20	26	32	38	4 4	50	56	6

ô

```
4621 GCTGTACGTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                   4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                       4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                                                              4861 GITCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                                                                                                                                                                                                                          TITLE OF INVENTION: High Molecular Weight Surface Proteins TITLE OF INVENTION: High Molecular Weight Surface Proteins TITLE OF SEQUENCES: 0 CORRESPONDENCES: 10 CORRESPONDENCE ADDRESS: ADDRESSE: Shoemaker: STREPH: STREPH:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               SOFTWARE: Patentin Release #1.0, Version #1.30
CURRENT APPLICATION DATA:
APPLICATION NUMBER: US/08/728,470
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   CLASSITION: 424
PRIOR APPLICATION 1424
PRIOR APPLICATION DATA;
APPLICATION NUMBER: US 06/302,832
FILING DATE: 16-MAR-1993
PRIOR APPLICATION DATA:
APPLICATION NUMBER: US PCT/US93/02166
FILING DATE: 16-MAR-1993
FROR APPLICATION DATA:
APPLICATION NUMBER: GB 9205704.1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           NAME: BEKRITESSET, JETTY W
REGISTRATION NUMBER: 22,651
REFERENCE/DOCKET NUMBER: 1038-633
TELECOMMUNICATION INFORMATION:
TELEFHONE: (703) 415-0810
TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 3:
SEQUENCE CHARACTERISTICS:
LENGTH: 4937 base pairs
TYPE: nucleic acid
STRANBENESS: single
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1: Floppy disk
IBM PC compatible
iYSTEM: PC-DOS/MS-DOS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Sequence 3, Application US/08728470 Patent No. 5928651 GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ; TOPOLOGY: linear; MOLECULE TYPE: DNA (genomic) US-08-728-470-3
                                                                                                                                                                                                                                                                                                                                                            4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                   4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         FILING DATE: 16-MAR-1992
ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ZIP: 22202-0286
COMPUTER READABLE FORM:
MEDIUM TYPE: Floppy o
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        COMPUTER: IBM PC (OPERATING SYSTEM:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Virginia
U.S.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Arlington
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        FILING DATE
                                                                                                                                                                                                                                                                                                                                                                                                                                                           RESULT 5
US-08-728-470-3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            COUNTRY:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       STATE:
                                                                                                                     δ
                                                                                                                                                         g
                                                                                                                                                                                                οy
                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                            ò
```

```
961 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG 1020
                                                                                                                                                                                                                              540
                                                                                                         61 CACCITITITGCAGICTATATGCAAATATTITAAAAAATAGTATAAATCCGGCCATATAA 120
                                                                                                                          61 CACCTTTTTGCAGTCTATATGCAATATTTTAAAAAAATAGTATAAATCGCCATATAA 120
                                                                                                                                                                             241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                 301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                                                                                      540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      099
                             0; Gaps
                                                                                                                                                            121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                            361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                                                                                                                               421 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         721 GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                781 GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      901 TICACCTICGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGTTTAATT 960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             481 CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      661 CAATTTAACATGGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC
Ouery Match
Ouer Match
100.0%; Score 4937; DB 2; Length 4937;
DB 2t Local Similarity 100.0%; Pred. No. 0;
Matches 4937; Conservative 0; Mismatches 0; Indels 0;
                                                                             g
                                                                                                         δ
                                                                                                                                q
                                                                                                                                                            ò
                                                                                                                                                                                    q
                                                                                                                                                                                                                δy
                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                                                    QΩ
                                                                                                                                                                                                                                                                   à
                                                                                                                                                                                                                                                                                              pp
                                                                                                                                                                                                                                                                                                                        ŏ
                                                                                                                                                                                                                                                                                                                                                                           δy
                                                                                                                                                                                                                                                                                                                                                                                                                              òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                       QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     QQ
```

δ QQ ò

ŏ qq δ qq δ q

ò

ò

3121 ACCAATAATGGCACTGCCGAAATTAATAACACAAGGAGTGGTAAAAACTTGGCAATGTT 3180 3181 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAGGAAGCATCATC 3240 3001 GITAAIGGGAGITIAAGITIAACIGGCGAAAAIGCAGAIAITAAAGGCAAICICACIAII 3060 3001 GITAAIGGGAGIITAAGIITAACIGGGGAAAAIGCAGAIAITAAAGGCAAICICACIAIT 3060 3061 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTT 3120 2941 AATAACGCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC 3000 2640 2881 AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 2940 2521 CCAAACGAGAACATGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 2580 2641 GAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT 2700 2701 GTTCGCGGCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCA 2760 2821 AATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCA 2880 2461 GTAAATGGCAACATGTCATTCAATGTCAAAGAAGGAGGGAAGTTAATTTCAAATTAAAA 2520 2401 AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 2460 2161 GATITCAGGGCTAACAACGTATCTITAAACGGAACGGGTAAAGGTCTGAATATCATITCA 2220 2221 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280 2221 TCAGTGAATATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280 2281 ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 2340 2341 AACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAATACATTTCA 2400 2460 2161 GATTTCAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAAGGTCTGAATATCATTTCA 2220 2581 GCCACTGGTGGGGGCTCTGTTTTTTTGATATATATGCCAACCATTCTGGCAGAGGGGCT qq Οy qq δλ q Óγ qq δλ QQ Óγ q Óγ qq Оp δy qq δλ qq δ δ Op δy q δy qq QΥ g ò qq ò QQ δ αq Qγ

```
3181 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC 3240
                      3301 GAAAICCAAATTGGGGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT 3360
                                                                                3361 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGAGGACTCTAGT 3420
                                                                                                                                                           3421 TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA 3480
                                                                                                                                                                        3481 GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 3540
                                                                                                                                                                                                                     3541 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3600
                                                                                                                                                                                                                                                                 3601 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 3660
                                                                                                                                                                                                                                                                                                            3661 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3720
                                                                                                                                                                                                                                                                                                                                                        3721 ATTACTGCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC 3780
                                                                                                                                                                                                                                                                                                                                                                                                   3781 ACCGCGTCGGAAAAGGTTACCACCACAGCAGGCTCGACCATTAACGCAACAATGGCAAA 3840
                                                                                                                                                                                                                                                                                                                                                                                                                                                3841 GCAAGTATTACAACCAAAACAGGTGATATCAGGGTACGATTTCCGGTAACACGGTAAGT 3900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          3901 GITAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAATTGAAGCGAAATCGGGT 3960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4021 AATGITACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCCCAGAAATTAATGCGACA 4080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4141 ATCACTICAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACGTGGCAGGCTCG 4260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4261 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4261 GATATTAAAGCAACCAGGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4081
                                           qq
                                                                                        qq
                                                                                                               òγ
                                                                                                                                   q
                                                                                                                                                            ò
                                                                                                                                                                               qq
                                                                                                                                                                                                      ò
                                                                                                                                                                                                                         Q
                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                            QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Оp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
```

```
4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                       4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440
                                                                         4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAAACGCGTCCTT 4560
                                                                                                                                                                                       4561 GAAAAAGTAAAAGATTTATCTGATGAAAAAAGAAAACATTAGGTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                            4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                     4681 ACCAGACCGTCAAGTCAAGTGATATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                          4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                                                                                                                                                                   4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4861 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Sequence 3, Application US/08617697
; Sequence 3, Application US/08617697
; GENERAL INFORMATION:
; APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
; TITLE OF INVENTION: of No. 5977336-Typeable Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldq. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    STWILE:
COUNTRY: 0.5.A.
ZIP: 22202-0286
COMBUTER READABLE FORM:
WEDIUM TYPE: FIDEPPY disk
COMPUTER: IBM PC compatible
OPERATING SYSTEM: PC-DOS/MS-DOS
SOFTWARE: Patentin Release #1.0, Version #1.30
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CURRENT APPLICATION DATA:
APPLICATION NUMBER: US/08/617,697
FILING DATE: 01-APR-1996
CLASSIFICATION: 424
PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Arlington
Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ADDRESSEE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         US-08-617-697-3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               RESULT 6
                          qq
                                                        ò
                                                                                   pp
                                                                                                               ò
                                                                                                                                          Op
                                                                                                                                                                      ò
                                                                                                                                                                                                 Db
                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                        Q
                                                                                                                                                                                                                                                                                      ά
                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                             òγ
                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  οχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δy
```

```
g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Dρ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              òχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         α
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ŏ
                                                                                                                                                                                                                                             ΩD
                                                                                                                                                                                                                                                                    Qχ
                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                               Ωý
                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                          Ω
                                                                                                                                                                                                                                                                                                                                                                             Db
                                                                                                                                                                                                                                                                                                                                                                                                    òχ
                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Οy
                                                                                                                                                         qq
                                                                                                                                                                                                    g
                                                                                                                                                                                                                          οy
                                                                                                               pp
                                                                                                                                      ŏλ
                                                                                                                                                                                δλ
                                                                     Dp
                                                                                          ŏχ
                                                                                                                                                                                                                                                           0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     661 CAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           421 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                                                              ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                           61 CACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAATAGTATAAATCCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                       61 CACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                       121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                           241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGCCAAGAATGAAGAGGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GAACGCAAATGATAAAGTAAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                                0; Gaps
                                                                                                                                                                                                                                      DB 2; Length 4937;
                                                                                                                                                                                                                                                             Indels
                                                                                                                                                                                                                                                             0;
                                                                                                                                                                                                                                      Query Match 100.0%; Score 4937; I
Best Local Similarity 100.0%; Pred. No. 0;
Matches 4937; Conservative 0; Mismatches
                                        us PCT/US93/02166
                                                                   NAME: BEFKSTESSEY, JELTY W
REGISTRATION NUMBER: 22,651
REFERNICE/DOCKET NUMBER: 1038-557
TELECOMMUNICATION INFORMATION:
TELEPHONE: (703) 415-0810
INFORMATION FOR SEQ ID NO: 3:
SEQUENCE CHARACTERISTICS:
LENGTH: 4937 base pairs
TYPE: nucleic acid
STRANBONESS: single
FILING DATE: 05-OCT-1994
PRIOR APPLICATION DATA:
APPLICATION NUMBER: US PCT/HEGG // FILING DATE:
                                                                                                                                                                                             TOPOLOGY: linear
MOLECULE TYPE: DNA (genomic)
                                                 FILING DATE: 16-MAR-1993
ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                  US-08-617-697-3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                  ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                        d
                                                                                                                                                                                                                                                                                                                                                                                                                                                            οy
                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                        δy
```

δ

ò

```
1741 CCAACAGGCACCGGTGAAGCAAGCGACCTAAAAAAATAGCGAACTCAAAACAACGCTA 1800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1501 AAAGAAAAAGGCGGACGCCTATTGTGTGGGGCGATATTGCGTTAATTGACGGCAATATT 1560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1561 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT 1620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1621 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1801 ACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCATCA 1860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1441 GGCATTCAATTAGCAAAGAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC 1500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1381 TCAGGTAAAGAAGGGGGAGAAACTTACCTTGGCGGTGACGAGGCGCGCGAAGGTAAAAAC 1440
                                                                                                                                                                                                                                                                                                                                                                1201 GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1251 AAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1321 GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1380
                                                                                                                                                                                                                                                                                            ATTAGCGTAAAATGGTGGCAGCATTTCTTTACTCGCAGGCAAAAAAATCACCATCAGCGAT 1080
                                                                                                                                                                                                                                                                                                                                                                                                                1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCGTGAAAATGAAGGGGGTCAATCTG 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1141 GGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA 1200
                                                                                                                                                                                                                                                                          961 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG 1020
                                                                                                                                   901 TTCACCTTCGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGTTAAATT 960
                                                                                                                                                                                                                                         901 TTCACCTTCGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGTTTAATT 960
                                                                     781 GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
```

qq	1801		1860
Qy Db	1861 1861	AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCA 	92,
Qy Db	1921	GGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCG	98 8
Oy Dp	1981	CATAAAAATATTACGCTTGATC 	040
oy Db	2041	ATAACAAAGCACG 	10
Qy Dp	2101	ATTACAGGAGGGAAA. 	16.
Oy Dp	2161	AGGTCTGAATATCATTTC 	22
Qy Dp	2221	TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA : 	œ œ
Qy Db	2281	ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG :	ന് ന്
S S	2341	AACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAATACTTTCA :	2400
Qy Db	2401	AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGGGAATTTTAACGGC ; 	2460
Qy Dp	2461	GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAA 2 	2520
Qy Dp	2521		58
Qy Db	2581 (2581)	F1 F1	64
Qy Db	2641 (	SCTAATTTTACCTTAAATTCCCAT	707
Oy Db	2701 ( 2701 (	TTAACCATAAATGCAACCAATTCA 	76
Oy Dp	2761 <i>h</i>	AATTTCAGCCTCAGACAAAAGATGATTTTATGACGGGTACGCAGCAATGCCATC 2 	82
Dy Ob	2821 A	GGTGGACAAACTCA :	88
λά.	2881 A	AATGTTACGCTAGAAGCC 2	94

```
2881 AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAAATGTTACGCTAGAAGCC 2940
                              2941 AATAACGCCCCTAATCAGCAAAACATAAGGGATAGATTATAAAACTTGGCAGCTTGCTC 3000
                                                  1941 ATTARCCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAAACTTGGCAGCTTGCTC 3000
                                                                                           3001 GTTAATGGGAGTTTAAGTTTAACTGGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT 3060
                                                                                                              3061 TCAGAAAGGGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTT 3120
                                                                                                                                                                            3061 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTT 3120
                                                                                                                                                                                                                   3121 ACCAATAATGGCACTGCCGAAATTAATAATAACACAAGGAGTGGTAAAACTTGGCAATGTT 3180
                                                                                                                                                                                                                                    3121 ACCAATAATGGGACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGCAATGTT 3180
                                                                                                                                                                                                                                                                              3181 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC 3240
                                                                                                                                                                                                                                                                                                           3181 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAAGGCAACCAAAGAAGGATCATC 3240
                                                                                                                                                                                                                                                                                                                                          3301 GAAATCCAAATTGGGGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT 3360
                                                                                                                                                                                                                                                                                                                                                                                                                         3301 GAAATCCAAATTGGGGGGAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT 3360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                3361 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGAGGACTCTAGT 3420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             3361 AAAATTAATATCACCAAACAATAACAATCAAAAAGGGTATTGATGGAGGGCTCTAGT 3420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             3421 TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA 3480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              3481 GACCTAAGTATTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 3540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           3541 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      3601 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 3660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 3661 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              3721 ATTACTGCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATGC 3780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           3781 ACCGCGTCGGAAAAGGTTACCACCACAGCAGGCTCGACCATTAACGCAACAAATGGCAAA 3840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        3841 GCAAGTATTACAACCAAAAAGGGTGATATCAGGGGTACGATTTCCGGTAACACGGTAAGT 3900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                   g
                                                                                                                                                          ò
                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                q
                                                                                                                                                                                                                                                                             ŏ
                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
```

```
FILING DATE
                                                                                                                                        COMPUTER:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     4801 GTAGATTICATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4861 GIICAGIACGGGCIIIACCCAICIIGIAAAAAIIACGGAGAAIACAAIAAAGIAIIII 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                 4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440
4141 ATCACTICAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                              4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                                                       4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                                                   4261 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                          4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                                                                                                                                                                                                                                                                                                               4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          US-08-719-641-3
US-08-719-641-3
US-08-719-641-3
Sequence 3, Application US/08719641
Factor No. 6218141
GENERAL INFORMATION:
APPLICANT: Barenkamp, Stephen J
APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                   òγ
                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                                                                                                                                                                                                                             ВÞ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                 g
                                                                                                                                                                                  g
                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                    q
                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                   οy
```

```
141 CACATGAAATGATGAACCGAGGAAGGAGGAGGGAGGCAAAAAAATGAAGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               361 ATATATCGTCTCAAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       61 CACCITITITGCAGICTATATGCAAATATITTAAAAAAAATAGTATAAATCGGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 100.0%; Score 4937; DB 4; Length 4937; 100.0%; Pred. No. 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Indels
                                                                                            ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
of No. 6218141-Typeable Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PatentIn Release #1.0, Version #1.30
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         0; Mismatches
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                CLASSIFICATION: 530
PRIOR APPLICATION DATA:
APPLICATION NUMBER: US 08/302,832
FILING DATE: 16-SEP-1994
FILING DATE: 16-SEP-1994
APPLICATION NUMBER: US PCT/US93/02166
FILING DATE: 16-MAR-1993
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              OPERATING SYSTEM: PC-DOS/MS-DOS SOFTWARE: PATENTIN Release #1.0, V CURRENT APPLICATION DATA: APPLICATION NUMBER: US/08/719,641
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1038-625
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      APPLICATION NUMBER: GB 9205704.1 FILING DATE: 16-MAR-1992 ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              IBM PC compatible
YSTEM: PC-DOS/MS-DOS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ALIONELLY DOLLY IN CONTROL OF THE RESIDENCE OF THE RESIDE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         , MOLECULE TYPE: DNA (genomic) US-08-719-641-3
                                                                                                                                                                                                                                                                                                                                                                                                             COMPUTER READABLE FORM:
MEDIUM TYPE: Floppy disk
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Conservative
                                              10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PRIOR APPLICATION DATA:
    TITLE OF INVENTION: OF NUMBER OF SEQUENCES: 1 CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Best Local Similarity
Matches 4937; Conserva
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           linear
                                                                                                                                                                                                                                                                                     STATE: Virginia COUNTRY: U.S.A. ZIP: 22202-0286
                                                                                                                                                                                                                                                    Arlington
```

.

	CGGGGTTGTGACCATTCCACAGAAAAAGGCTTCCGCTATGTTACTATCTTAGGTGTAAC 480 	ACTTICCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 54  	TACAAG        TACAAG	CAAGTAGATGGTAATAAAACCATTATCGGCAACAGTGTTGACGCTATCATTAATTGGAAA 660 	AAATGGTGCAGTTTTTACAAGAAAACAACAACAACTCGGCC 72) 	AATCTCCCAATTAAAAGGATTTTAGATTCTAAC 78 	ACAATAGGTAAAG 	TTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 90 	CGCTGAAATTGTGAATCACGGTTTAATT 96 	SAAAAACGAGGTGTG 10: 	SCAGGGCAAAAATCACCATCAGCGAT 1081 	FAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATCTG 1140 	GCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCA 120 	STAAACTITCIGCIGATICTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTCCGCC 126 	AGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 13; 	SGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1380 	CAGGTAAAGAAGGGGGAGAAACTTACCTTGGGGGTGACGAGGGGGGGG	GCATTCAATTAGCAAAGAAACTCTTTAGAAAAGGCTCAACCATCAATGTATCAGGC 1500
ATATAT	CGGGGT         CGGGGT	CACTTA	CAATCT         CAATCT	CAAGTA         CAAGTA	AATT       AATT	TATIC       TATIC	GACAA             GACAA	CTAAT        CTAAT	TCACCT         TCACCT	CTGTCG         CTGTCG	TTAGCG        TTAGCG	AATAA 	CGAT	TAAAC         TAAAC	GAGG           GAGG	CAAGC	SGTA	CATTC
361	421	481	541	601	661	721	781	841	901	961	1021	1081	1141	1201	1261	1321 ( 1321 (	1381	1441
Q	QY Db	Qy Db	Qy Db	Qy Db	Qy Db	Qy Dp	Q <sub>Y</sub>	Qy Db	Qy Db	Qy Dp	Qy Dp	Qy Dp	ογ	QY Dp	Qy Dp	0y Db	Oy Db	λο <b>s</b>

```
1441 GGCATTCAATTAGCAAAGAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC 1500
                             1501 AAAGAAAAAGGGGGACGCGCTATTGTGTGGGGGGGATATTGCGTTAATTGACGGCAATATT 1560
                                           1561 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT 1620
                                                                                                     1621 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCGTGT 1680
                                                                                                                                                            1681 GATGTAACAATTGAAGCCGGAAGACCCCCTTCGCAATAATACCGGTATAAATGATGATGAATTC 1740
                                                                                                                                                                                                                  1741 CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAATAGCGAACTCAAAACAACGCTA 1800
                                                                                                                                                                                                                                                                        1801 ACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCATCA 1860
                                                                                                                                                                                                                                                                                                                               1861 AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT 1920
                                                                                                                                                                                                                                                                                                                                                                                     1921 AGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA 1980
                                                                                                                                                                                                                                                                                                                                                                                                                                           1981 AATTTAACCATTTATTCTGGGGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 2040
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2041 GGTTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 2100
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2041 GGTTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGGCGCC 2100
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                2101 GACGCGGCAAATGCTAAAATTGTCGCCCAGGGCACTGTAACCATTACAGGAGGGAAAA 2160
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 2161 GATTICAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTTCA 2220
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       2221 TCAGTGAATATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2281 ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 2340
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2341 AACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAATACATTTCA 2400
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2341 AACGTCAGTGCTCTTAATCTAGAGACACGCGCAAATTTTACCTTTATTAAATACATTTCA 2400
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  2401 AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 2460
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2461 GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAA 2520
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2461 GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAAATTTCAAATTAAAA 2520
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                2521 CCAAACGAGAACATGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 2580
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 2521 CCAAACGAGAACATGAACAAACAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 2580
                                                       qq
                                                                                    ð
                                                                                                              qq
                                                                                                                                          ò
                                                                                                                                                                  qq
                                                                                                                                                                                                 δ
                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                 QQ
                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         q
```

ò

2640	70	2760	2820	2880	2940	3000	3060	3120	3180	3240	3300	3360	3420	3480	A 3540 I A 3540	c 3600   c 3600	G 3660   G 3660
GCCACTGGTGGGGGCTCTGTTTTTTGATATATATGCCAACCATTCTGGCAGAGGGCT	CCACTGGTGGGGGCTCTGTTTTTTTGATATATATGCCAACCATTCTGGCAGAGGGG AGTTAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCC 	GTTCGCGGCGATGACGCTTTTAAAÅTCAACAAAGACTTAACCATAAATGCAACCAATTCA 	AATTTCAGCCTCAGACAGACGAAAGATGATTTTATGACGGTACGCACGC	AATTCAACCTAGAACATATCCATTCTGGGGGGTAATGTCACCCTTGGTGGACAAAACTCA	AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 	AATAACGCCCCTAATCAGCAAAACATAAGGGATAGATATAAAACTTGGCAGCTTGCTC	GTTAATGGGAGTTTAAGTTTTAACTGGGGAAAATGCAGATATTAAAGGCAATCTCACTATT	TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTT 	1 ACCAATAATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGCAATGTT	1 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAGAAGCATCATC 	1 GGCGGAGATATAATCAACAAAAAGGAAGCTTAAATATTACAGACAG	1 GAAATCCAAATTGGCGGCAATATCTCGCAAAAAGAAGCCAACCTCACGATTCTTCCGAT 	1 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGGGCTCTAGT 	1 TCAGATGCGACAAGTAATGCCAACCTAA( 	GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTT 	1 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAA 	1 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGT 
28	2581 2641 2641	2701 2701	2761 2761	2821 2821	2881	2941	3001	3061	3121	3181	3241	3301	336.	342	348	54 54	360
λζ	op op	Qy Dp	ΟΥ Db	Qy	Qy Db	Qy Db	oy Pb	Qy	Oy Db	QY Db	Oy Dp	QY Db	QY Dp	Qy Dp	Oy Db	QY Db	Qy Db

pp δ QQ ò

δ

ò

4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620 4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680 4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800 4561 GAAAAAGTTAAAGATTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620 4320 4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380 4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440 4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500 4501 AAATATTCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560 4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200 4260 4260 4081 GAAGGAĞCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140 3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTCCGGTAATACGGTA 4020 4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080 3781 ACCGCGTCGGAAAAGGTTACCACCACAGGCTCGACCATTAACGCAACAAATGGCAAA 3840 3661 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3720 ATTACTGCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC 3780 4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4261 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 3841 GCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAAGT 3721 pp QQ Óγ Óγ ΩŊ qq oγ pp QΥ Db Ωy QQ Ω Qγ qq δy qq qq Qγ В δ qq δy ò pp qq οy Ω Dp òγ ŏλ ò

```
421 CGGGGTIGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                       481 CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 540
                                    541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600
                                                                                                                                                                                                                                                                                                                                                                                     961 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGTGTG 1020
                                                                                                                                                                                                                                                                                                                                                                                                   1021 ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAATCACCATCAGCGAT 1080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATCTG 1140
                                                                                 601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                            1021 ATTAGCGTAAATGGTGGCAGCATTCTTTACTCGCAGGGCAAAAAATCACCATCAGGGAT 1080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          721 GTATICAACGGGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780
                                                                                                                                                                                                                   781 GGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                1141 GGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA 1200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1201 GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTCCGCC 1260
                                                                                                                                                                                                                                                                                            841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900
                                                                                                                                                                                                                                                                                                            901 TTCACCTTCGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGTTTAATT 960
                                                                                                                                                                                                                                                                                                                                                      1261 AAAGAGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1321 GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1381 TCAGGTAAAGAAGGGGGAGAACTTACCTTGGCGGTGACGAGCGGGGGGAAGGTAAAAC 1440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1441 GGCATTCAATTAGCAAAGAAACCTCTTTAGAAAAGGCTCAACCATCAATGTATCAGGC 1500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1501 AAAGAAAAAGGGGGGGGGGGTATTGTGGGGGGGATATTGCGTTAATTGACGGCAATATT 1560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                         q
                                                                                                                δ
                                                                                                                                   qq
                                                                                                                                                           δy
                                                                                                                                                                                qq
                                                                                                                                                                                                       ò
                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                  ð
                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                              ŏ
                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                 ô
                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
```

۵

														0 0	0 0	0 0	0 0
1620 1620	68	1740	0 0	9	1920 1920	<b>∞</b> ∞	4 4	2100	2160 2160	2220		2340	0	2460	252	258 258	264
AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT	1 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 	GATGTAACAATTGAAGCCGAAGACCCCCTTCGCAATAATACCGGTATAAATGATGAATTC 	CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAATAGCGAACTCAAAAAAAA	1 ACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCATCA 	1 AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT	1 AGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATG 	1 AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 	1 GGTTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAATAACAAAGCACGC 	1 GACGCGGCAAATGCTAAAATTGTCGCCCAGGGCACTGTAACCATTACAGGAGAGAAAA	1 GATTICAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATAICATTICA 	1 TCAGTGAATAATTTAACCCACP 	1. ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 	1 PACGTCAGTGCTCTTAATCTAGAGAGCGCAAATTTTACCTTTATTAAATACATTTCA 	1 AGCAATAGCAAAG                   1    1    1	1 GTAAATGGCAACAT 	AAACCTTTACCAAT1 	81 GCCACTGGTGGGGGCTCTGTTTTTTGATATATATGCCAACCATTCTGGCAGGGGCT 
1561	1621 1621	1681	1741	1801	1861	1921	1981	204	210	216	222	228	234	240	246	252	258
Oy Dp	Oy Dp	oy Ob	Qy	Qy	Q7 Db	Qy Db	Qy Db	δγ	Oy Dp	Qy Db	Qy	Qy Db	Qy	QY	Qy Db	Qy	Qy Db

1.5	82	888	294 294	300	30	31	31	e e	33	33	34	34	3.	9 9	m m	37	37
ACCTTAAATTC ACCTTAAATTC AATGCAACCAAAATCIIIIIIIIIIIIIIIIIIIIIIIII	GCACGCAATGC 	GGTGGACAAAA                GGTGGACAAAA	GTTACGCTAGA 	CTTGGCAGCT	GGCAATCTCA              GGCAATCTCA	ATCACCGGCA 	AAACTTGGCA 	CCAAAGAAGCA 	CAGTAATAATG 	CACGATTTCTT 	rggagaggact                 rggagaggact	ATTGAAATTGA 	AGATGGTAGAG 	AACAGTAACTT 	ACTAAATAGCA               ACTAAATAGCA	CGATACCGGCT	CAAAACAGTAA
CGCTAATTTT 	ATGACGGGTAC             ATGACGGGTAC	ATGTCACCCTT	AAGCAGCAAAT                 AAGCAGCAAAT	GAGTTATAAA              GAGTTATAAA	CAGATATTAA? 	ATACCCTAAA) 	AAGGAGTGGT!               AAGGAGTGGT!	CTAAACGCAA( 	ATATTACAGA             ATATTACAGA	AAGGCAACCT 	AGGGTATTGA 	AAACCAAAGA 	TTACAGCCAA               \TTACAGCCAA	SCCGAAGCCAA                SCCGAAGCCAA	CACAATGTGAC 	AATAGCGACAA                      ATAGCGACAA	ATTACTTCTCT
ATCTCTAACG( 	GATGATTTTT            GATGATTTTT	CTGGGCGGTA 	ACTATCGAGA 	ATAAGGGATA 	GGCGAAAATG               GGCGAAAATG	AAGACTAGAG             \AAGACTAGAG	PATATAACAC 	raccactcace	AGGAAGCTTAP 	CTCGCAAAAAC 	AACAATCAAAA                AACAATCAAAA	CCTAACTATT/ 	TAAAGCAGAGI              TAAAGCAGAGI	TAACAGCGGT(             TAACAGCGGT(	TGCTGACGGT             TGCTGACGGT	ACGTGAAAGC	AAACAAAGAT
TGAAATTAAT 	SACAGACGAAA                SACAGACGAAA	ACATATCCATT 	CGGGGAATATT 	ATCAGCAAAAC                  ATCAGCAAAAC	FAAGTTTAACT 	CTTTTAAAGG 	CTGCCGAAATI 	ATTTAAACAT 	TCAACAAAAA               TCAACAAAAA	GCGGCAATATO 	CCAAACAGAT,                 CCAAACAGAT,	GTAATGCCAA              GTAATGCCAA	CAGGTTTCAA 	GTAATGACGG                 GTAATGACGG	CAAAAATCTC 	AGCAATGGCGG	AATGTAGAAGT
GTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT GITAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT GTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTACCTTAAATTCCAT TCGCGGCGATGACGTTTTAAAATCAACAAAGCTTAACCATAAATGCAACCAATTCA 2 TTGTTTTAAAATTCAACTATTAAAATCAACAAAGATTAACATTAACCATAAATGCAACCAATTCA 2	FTTCAGCCTCAC 	FTCAACCTACA! 	CAGCAGCATTA( 	TAACGCCCTA              TAACGCCCCTA	TAATGGGAGTT	AGAAAGCGCCA                  AGAAAGCGCCA	CAATAATGGCA                CAATAATGGCA	CCAATGATGGTG 	CGGAGATATAA 	SAAATCCAAATTG 	AAAATTAATATCA                    AAAATTAATATCA	TCAGATGCGACAA              TCAGATGCGACAA	CCTAAGTATTI 	TATTGGCAACA 	AATGTTAAAGAT1 	AAACATCTAGCA	TTACTGCAAAAAA
2641 GAG 2641 GAG 2701 GTJ 2701 GTJ	761 AA    761 AA	1 2	2881 AGCA           2881 AGCA	941 AA    941 AA	001 GT    001 GT	061 TC     061 TC	21 AC	181 AC 	241 GC 241 GC	301 G	61 #	21	481 481	541 541	01	661	721
Qy Qy Db		Qy	Qy	Qy	QY	Qy	QY Db	O.y D.b	QY Db	Qy	Qy	Qy	Qy	Qy	QY	Qy	Οy

```
COMPUTER:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        TOPOLOGY:
                                                                                                                                                US-08-038-682-6
                                                                                                                                                                                                                                                                                                                        COUNTRY:
                                                                                                                                                                                                                                                                                                                                                                                            SOFTWARE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            US-08-038-682-6
                                                                                                                                                                                                                                                                                       STREET:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Query Match
                                 ά
                                                        QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
3721 ATTACTGCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAATG 3780
                                 3781 ACCGCGTCGGAAAAGGTTACCACCACGAGGCTCGACCATTAACGCAACAAATGGCAAA 3840
                                              3841 GCAAGTATTACAACCAAAACAGGTGATATCAGGGTACGATTTCCGGTAACACGGTAAGT 3900
                                                                                            3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960
                                                                                                                                      3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                                                                                                                   4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080
                                                                                                                                                                                                                               4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140
                                                                                                                                                                                                                                                                            4141 ATCACTICAACTAAGGGICAGGIAGACCICITGGCICAGAAIGGIAGCAICGCAGGAAGC 4200
                                                                                                                                                                                                                                                                                                                        4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                                                                                                                                                                                                                                                      4261 GATATTAAAGCAACCAGGGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                                                                                                                                                  4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGG 4380
                                                                                                                                                                                                                                                                                                                                                                                                                                                             4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4441 AATAICATTICGAAAGAIGGIAGAAACACIGIGCGCITIAAGAGGCAAGGAAAITGAGGIG 4500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4501 AAATATTCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4561 GAAAAAGTAAAAAGATTTATCTGATGAAAAAGAGAAACATTAGCTAAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              4621 GCTGTACGTTTTGTTGACCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                        qq
                                                                                                   qq
                                                                                                                           δ
                                                                                                                                                                       ŏ
                                                                                                                                                                                            g
                                                                                                                                                                                                                  ŏ
                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                               аq
                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                      á
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
```

```
ö
4801 GTAGATITCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGGTTAAA 4860
                                    4861 GITCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                            4861 GITCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTTT 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    61 CACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAATAGTATAAATCCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             97.6%; Score 4820.2; DB 1; Length 9323; 98.5%; Pred. No. 0; Live 0; Mismatches 73; Indels 0;
                                                                                                                                                                                                                                                                                                                                      APPLICANT: ST. GEME III, JOSEPH W
TITLE OF INVENTION: HIGH MOLECULAR WEIGHT SURFACE PROFEINS
TITLE OF INVENTION: OF NON-TYPEABLE HAEMOPHILUS
                                                                                                                                                                                                                                                                                                                                                                                                                                           ADDRESSEE: Shoemaker and Mattare, Ltd
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SYSTEM: PC-DOS/MS-DOS
PatentIn Release #1.0, Version #1.25
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        CURRENT APPLICATION DATA:
APPLICATION NUMBER: US/08/038,682
FILING DATE: 16-MAR-1993
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1038-293
                                                                                                                                                                                                                                                                                                                       APPLICANT: BARENKAMP, STEPHEN J
                                                                                                                                                                                                                                                            ; Sequence 6, Application US/08038682
; Patent No. 5549897
; GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      IBM PC compatible
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           NAME: BERKSTRESSER, JERRY W
REGISTRATION NUMBER: 22,651
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        REFERENCE/DOCKET NUMBER: 10
TELECOMMUNICATION INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  MOLECULE TYPE: DNA (genomic)
                                                                                                                      4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (703) 415-0810
                                                                                                                                                             4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Floppy disk
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             9323 base pairs
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 6
SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Matches 4864; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            TYPE: nucleic acid
STRANDEDNESS: single
                                                                                                                                                                                                                                                                                                                                                                                                                      CORRESPONDENCE ADDRESS:
ADDRESSEE: Shoemaker
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 COMPUTER READABLE FORM:
                                                                                                                                                                                                                                                                                                                                                                                                  NUMBER OF SEQUENCES:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              OPERATING SYSTEM:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       inear
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Best Local Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   CITY: Arlington STATE: Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        U.S.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         FILING DATE: 1: CLASSIFICATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     MEDIUM TYPE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               TELEPHONE:
```

qq

Db Qy Db

Oy Oy

g

ολ

Dp

qq

Db Oy Oy

qq

οy

QQ

QQ

DP QY Db Qy Db

ογ

da 99 da

δ

2341 AACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAATACATTCA 2400 2401 AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC 2460 2101 GACGCGCAAATGCTAAAATTGTCGCCCAGGGCACTGTAACCATTACAGGAGAGAAAA 2160 2161 GATTTCAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTCA 2220 2281 ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTGGCACTGG 2340 1861 AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCCACTTAATTCTCCAT 1920 1921 AGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA 1980 1981 AATTTAACCATTATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 2040 2041 GGTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 2100 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280 2661 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAAJATAACA 2720 1681 GATGTAACAATTGAAGCCGAAGACCCCCTTCGCAATAATACCGGTATAAATGATGAATTC 1740 1801 ACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCATCA 1860 1621 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680 2121 GATGTAACAATTGAAGCCCGAAGACCCCCTTCGCAATAATACCGGTATAAATGATGATTC 2180 1501 AAAGAAAAAGGCGGACGCGTATTGTGTGGGGCGATATTGCGTTAATTGACGGCAATATT 1560 1561 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT 1620 1321 GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1380 1441 GGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC 1500 2221

	CAAAGAAGGGGGAAAGTTAATTTCAAATTAAAA 2520 	ACCAATTCGGTTTTTAGCCAATATCACA 258	TATATATGCCAACCATTCTGGCAGAGGGGT 264	SCGCTAATTTACCTTAAATTCCCAT 270	LAACGCGCTAATTTTACCTTAAATTCCCA ACAAAGACTTAACCATAAATGCAACCAATTC	SAAAGAC	GATTTTATGACGGGTACGCACGCAATGCCATC 2820 	3GTGGACAAAACTCA 2880 			3000	SCAGATATTAAAGGCAATCTCACTATT 306	AAAATGCAGATATTAAAGGCAATCTCACT	CTAGAGATACCCTAAATATCACGGGAATTTT 3120 	AACACAAGGAGTGGTAAAACTTGGCAATGTT 318	62	CTCACGCTAAACGCAACCAAAGGAGCATCATC 3240 	STAATAATGATGCT 330	CTTAAATATTACA	AAAAAGAAGCCAACTCACGATTTCTTCCGAT 3360 	CAAAAAAGGGTATTGATGGAGAGGACTCTAGT 342	98	8 6	NGAGATTACAGCCAAAGATGGTAGAGATT	
	1 GTAAATGGCAACATGTCATT( 	1 CCAAACGAGAACATGAACAC 	GCCACTGGTGGGGGCTCTGT	GAGTTAAAAATGAGTGAAAT	GTTCGCGGCGATGACG	Treececearcacerr	AATTTCAGCCTCAGACAGAC 	AATTCAACCTACAACATATCCATJ	GCAGCAGCATTACGGGGAA		AATAACGCCCTAATCAGCAAA(	GTTAATGGGAGTTTAAGTTTAA	ratgggagtttaggtt	TCAGAAAGCGCCACTTTTAAAGC	CCAATAATGGCACTGCCG	ACCAATAATGCCACTGCCGAAA	ACCAATGATGGTGATTTAAACAT 	GGCGGAGATATAATCAACAAAAAAGG	GCGGAGATATAAT	GAAATCCAAATTGGGGGCAATAT 	AAATTAATATCACCAAACAG	AAAATTAATATCACCAAACAGA	TCAGATGCGACAAGTAATGCCAACO	STATTCAGGTTTC	
	246	252	3021	2641	270	314	3201	2821	2881	3321	3381	3001	44	3061	3121		3181	24	9	3301	3361	3801	3421	3481 (	
QΩ	9 P	oy Op	OY Db	Q d	Οy	g ,	oy Op	Q Q	ογ	αqα	Qy Dp	δλ	рp	O D D	δ	QQ	Oy Db	οy	g .	<u>ک</u> و	ξ	g	λ. q	<u></u>	,

```
3921 GACCTAAGTATTTCAGGTTTCAATAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 3980
                          3541 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3600
                                         3601 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 3660
                                                                                               3661 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3720
                                                                                                                                                  3721 ATTACTGCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATTC 3780
                                                                                                                                                                                                    4161 ATTACTGCAAAAAATGTAGAAGTAAAGAAAGATATTACTTCTCAAAACAAATATC 4220
                                                                                                                                                                                                                                       3781 ACCGCGTCGGAAAAGGTTACCACCACAGCGGCTCGACCATTAACGCAACAAATGGCAAA 3840
                                                                                                                                                                                                                                                       3841 GCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAAGT 3900
                                                                                                                                                                                                                                                                                                          3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960
                                                                                                                                                                                                                                                                                                                                                             3961 GAGCCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                                                                                                                                                                                                                                                                                                                                                 4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGGCGGTTCTAGC 4140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4141 ATCACTICAACTAAGGGICAGGIAGACCTCTIGGCTCAGAATGGIAGCAICGCAGGAAGC 4200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4261 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4821 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4880
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGAAAATGGGTTA 4440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4881 AATATCATTTCGAAAGATGGTAGAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4940
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 4501 AAATATTCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGGTCCTT 4560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4561 GAAAAAGTAAAAAGTTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  QQ
                                                                              à
                                                                                                       QQ
                                                                                                                                                          qq
                                                                                                                                                                                                           QQ
                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                           Qγ
                                                                                                                                                                                                                                                                                                                    q
                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                           q
                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
```

us-10-092-880-3.rni

```
4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                                                                4861 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                         5061 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 5120
                                                                                   4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                 4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
TITLE OF INVENTION: of No. 5603938-Typeable Haemophilus
NUMBER OF SEQUENCES: 8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 MEDIUM TYPE: Floppy disk
COMPUTER: IBM PC COMPATIBLE
OPERATING SYSTEM: PC-DOS/MS-DOS
SOFTWARE: Patentin Release #1.0, Version #1.30
APPLICATION DATA:
APPLICATION NUMBER: US/08/302,832
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    CLASSIFICATION: 4.5.

RIOR APPLICATION DATA:
APPLICATION NUMBER: GB 9205704.1
FILING DATE: 10-MAR-1992
FILING DATE: 10-MAR-1992
FILING DATE: 10-MAR-1993
APPLICATION NUMBER: US pct/us93/02166
FILING DATE: 10-MAR-1993
APTORNEY/AGENT INFORMATION:
NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 1038-404
FERENCE/DOCKET NUMBER: 1038-404
TELECOMMUNICATION NUMBER: 1038-404
TELECOMMUNICATION NUMBER: 1038-404
TELEPHONE: (703) 415-0813
INFORMATION FOR SEQ ID NO: 6:
SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ; Sequence 6, Application US/08302832
; Patent No. 5603938
; GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              DNA (genomic)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        LENGTH: 9323 base pairs
TYPE: nucleic acid
STRANDEDNESS: single
                                                                                                                                                                                                                                                                                                                                                                                                                              4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                    5361 AACAGGTTATTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ZIP: 22202-0286
COMPUTER READABLE FORM:
MEDIUM TYPE: Floppy (
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          inear
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Arlington
Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 CLASSIFICATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           , MOLECULE TYPE:
US-08-302-832-6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             TOPOLOGY:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      COUNTRY:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           US-08-302-832-6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      QQ
                                                                                                                                                                                                                                                                                                                                             οy
                                                                                                                                                                                                                                                                                                                                                                                  Dp
                                                                                                                                                                                                                                                                                                                                                                                                                              οy
                                                                                                                               q
                                                                                                                                                                           δ
                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                 С
```

```
ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             781 GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      841 ACTAATGGCTTTACGCCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          901 TICACCITICGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGTTAATT 960
                                                                                                                                                                                                                                                         601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                                                                           661 CAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC 720
                                                                                                                                                                                  421 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                          541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600
                                                                                                                                               861 CGGGGTTGTGACCATTCCACAGAAAAGGCAGCGAAAAAACCTGCTCGCATGAAAGTGCGT 920
                                                                                                                                                                                                                                                                                                                                  481 CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 540
                                                 121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                      61 CACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAATAGTATAAATCCGCCATATAA 120
                    0; Gaps
                                     Ouery Match
Best Local Similarity 98.5%; Pred. No. 0;
Matches 4864; Conservative 0; Mismatches 73; Indels 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Óλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δλ
                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                              ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                 òλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Ωy
                                                                                                                                                                                                                                                                                 Pp
                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                         Óχ
                                                                                                                δλ
                                                                                                                                  g
                                                                                                                                                    δλ
                                                                                                                                                                      g
                                                                                                                                                                                        δλ
                                                                                                                                                                                                         g
                                                                                                                                                                                                                           ΟŽ
                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                ŏ
                                                                                                                                                                                                                                                                                                   δλ
                                                                                                                                                                                                                                                                                                                                      δλ
                                                                             ŏ
                                                                                              q
```

Q P	1021	ATTAGCGTAAATGGTGGCAGCATTCTTTACTCGCAGGCAAAAATCACCATCAGGGT 10 ATTAGGGTAAATGGTGGCAGCATTTTTTTTACTCGCACAAAAAATCACCATCAGGAT
Οy	1081	ATAATAAACCCAACCATTACTTACAGCATTGCCGCGGGAAAATGAAAGGAACTAATAAATGAAAGTAAAAGTGAAAATGAAAGTAAAAGTAAAAAGTAAAAAA
qq	1521	ATAATAAACCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGGGGTCAATGT 158
Q Db	1141	A 12
ò	1201	TRABACTTTCTCTCTCTTTTTTTTTTTTTTTTTTTTTTTT
? 염	4	GGTAAACTITCTGCTGATTCTGTAAAGATAAAAGCGGCAATATTGTTCTTCCGCC 1260 GGTAAACTITCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 1710
οy	1261	GAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 132
QQ	1701	
70 2	N	
a a		GCAAGCTGATGATAAAGTCCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 182
g S	1821	TCAGGTAAAAGAGGGGAAAATTACCTTGGGGGTGACGAGGGGGGGG
δ	1441	SCATTCAATTAGGAAAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC 150
qq	1881	AGGC 194
Q D	1501	GTGGGGCGATATTGCGTTAATTGACGCAATATT 15
ò	1 9	TOTAL DE DOCUMENTATION DE LA TOTAL DEL LA TOTAL DE LA TOTAL DE LA TOTAL DE LA TOTAL DEL LA TOTAL DE LA TOTAL DE LA TOTAL DE LA TOTAL DEL LA TOTAL DE LA TOTAL DEL A TOT
og og	01	ANGOLIANGOLIGITATION NI
٥y	1621	ATTIATCCATTGACAGCAATGCAATGTTAAAAACAAAAGAGTGGTTGCTAGACCCTGAT 168
qq	2061	12
Qy Db	1681 (	74
δy	1741	CAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAAAAA
qq	2181 (	24
οy	801	CCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCATCA 186
q	41	CAATACAACTATTCCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGGATCA 230
λ G	1861 7	σ
ò	100	GRAAAGGMONACOMONACATACATCACATCACAGCAAGCAACTCCCACTTAATTCTCCAT 236
연	61	novanasourandustusedesdesdestiteksatitekseksitäestaanasettiettaaageegga 1980 
ΟY	1981 A	TTAACCATTTATTCTGGGGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 204
pp	421	8
o o	2041 G 2481 G	GTTTTTAAATATTACGGCGCTTCCGTAGCTTTTGAAGGTGGAATAACAAAGCAGGC 210 GTTTTTTAAATAATAACGGCGCGCGCGAACCAAAAAAAAA
ζ	2101 G	ACGCGGCAAATGCTAAAATTGTCGCCCAAGGCACTCTTAAAAATTAACAAAAGCACGC 254

2541 GACGCGGCAAATGCTAAAATTGTCGCCCAGGCCACTGTAACCATTACAGGAGGGAAAA 2600 2221 TCAGTGAATATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280 2161 GATTICAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTTCA 2220 2281 ATTAACCAAACTACGAGAAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTGG 2340 2341 AACGICAGIGCTCITAAICTAGAGACAGGCGCAAATTITACCITTATTAAATACATITCA 2400 2401 AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGGAGGGGTGAATTTTAAGGG 2460 2841 AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGGAGGGGTGAATTTTAACGGC 2900 2461 GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGGGGAAAGTTAATTTCAAATTAAAA 2520 2901 GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAA 2960 2521 CCAAACGAGAACATGAACACAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 2580 2961 CCAAACGAGAACATGAACAAAGCAAACCTTTACCAATTCGGTTTTTAGCCAATATCACA 3020 2581 GCCACTGGTGGGGGCTCTGTTTTTTTGATATATGCCAACCATTCTGGCAGGGGCT 2640 2641 GAGTTAAAAATGAGTGAAATTAATGTCTCTAACGGCGCTAATTTTACCTTAAATTCCCAT 2700 2701 GTTCGCGGCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCA 2760 2821 AATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCA 2880 2881 AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC 2940 2941 AATAACGCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC 3000 3001 GTTAATGGGAGTTTAAGTTTAACTGGGGAAAATGCAGATATTAAAGGCAATCTCACTATT 3060 3061 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATGACCGGCAATTT 3120 3121 ACCAATAATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGÇAATGTT 3180 3181 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGCATCATC 3240 етийтий пийтинатин пийтин принения οy qq ò qq δ g δ δy qq Ω g ŏ qq ò qq ò q qq ŏ δλ q δ q δy qq δ qq qq ö δŏ δ

```
4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ACCGCGTCGGAAAAGGTTACCACCACCAGGCTCGACCATTAACGCAACAAATGGCAAA 3840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4221 ACCGCGTCGGAAAAGGTTACCACACACAGGCTCGACCATTAACGCAACAATGGCAAA 4280
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GCAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGTAACACGGTAAGT 3900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          3961 GAGGCTAATGTAACGAAGGGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4261 GATATTAAAGCAACCAGCGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                  3721 ATTACTGCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCAAAACAGTAAATATC 3780
                                   3981 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 4040
                                                                                                                                                                                                                                                                                                                   3601 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 3660
                                                                                                                                                                                                                                                                                                                                3661 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3720
3621 ACCAATGATGGTGATTTAAACATTACCACTCACGCTAAACGCAACCAAAGAAGGATCATC 3680
                       3301 GAAATCCAAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT 3360
                                                                                                                     3361 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGAGGACTCTAGT 3420
                                                                                                                                                                                                                                                                  3541 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCCAAAACAGTAACTTTAAC 3600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             3901
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 3781
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Dβ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                             ΟŻ
                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                        Dp
                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                   οy
                                                                                                                                                                                                                                                                                                                                                                                        Db
                                                                                                                                                                                                                                                                                                                                                                                                                 ολ
                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ôλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Óγ
                                               pp
                                                                                             qq
                                                                                                                   ογ
                                                                                                                                          qq
                                                                                                                                                               δ
                                                                                                                                                                                          В
                                                                      ŏ
```

```
4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                               4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                                             4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                                                                                                                                                                                        5241 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 5300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAAAAAATTAGCTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                  5001 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAAAAAATTAGCTAAACTTGGTGTAAGT 5060
               4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                          ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440
                                                                                                                                                                           APPLICANT: BARENKAMP, STEPHEN J
APPLICANT: ST. GEME III, JOSEPH W
TITLE OF INVENTION: HIGH MOLECULAR WEIGHT SURFACE PROTEINS
TITLE OF INVENTION: OF NON-TYPEABLE HAEMOPHILUS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                18: Shoemaker and Mattare, Ltd
2001 Jefferson Davis Hwy., 1203 Crystal Plaza
Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              VSTEM: PC-DOS/MS-DOS
PatentIn Release #1.0, Version #1.25
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         APPLICATION NUMBER: US/08/530,198 FILING DATE: 13-DEC-1995 CLASSIFICATION: 424
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Sequence 6, Application US/08530198 Patent No. 5869065 GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                : Floppy disk
IBM PC compatible
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                5361 AACAGGTTATTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CURRENT APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 COMPUTER READABLE FORM:
MEDIUM TYPE: Floppy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 NUMBER OF SEQUENCES:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                OPERATING SYSTEM:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      CITY: Arlington
STATE: Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   COUNTRY: U.S.A.
ZIP: 22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ADDRESSEE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           US-08-530-198-6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            STREET:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           STREET:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                         Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                  q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                               οgα
                                                                                                                                                                                                          Op
                                                                                                                                                                                                                                                                     Вb
                                                                                                                                                                                                                                                                                                                              Db
                                                                                                                                                                                                                                                                                                                                                               οy
                                                                                                                                                                                                                                                                                                                                                                                                                        òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                               pp
                                                          ò
                                                                                        g
                                                                                                                    δy
                                                                                                                                                                               QΥ
                                                                                                                                                                                                                                         QΫ́
                                                                                                                                                                                                                                                                                                   ŏ
```

```
ó:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                181 CITICATCTITCATCTITCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT 240
                                                                                                                                                                                                                                                                                                                                   121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                        621 CITICAICTICAICTITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTIT 680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              241 CACATGAAATGATGAACCGAGGGAAGGGAGGGGGGCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 61 CACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              421 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      481 CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   541 CAATCIGITITAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         661 CAATTTAACATCGACCAAAATGAAATGGTGCTGTTTTTACAAGAAAACAACAACTCCGCC 720
                                                                                                                                                                                                                                                                                         0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      721 GTATICAACCGIGITACATCIAACCAAAICTCCCCAATTAAAAGGGATTTTAGATICIAAC 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 781 GGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                               1 TAAATATACAAGATAAATAAAATAAATCAAGATTTTTGTGATGACAACAACAATTACAA 60
                                                                                                                                                                                                                                                     97.6%; Score 4820.2; DB 2; Length 9323; 98.5%; Pred. No. 0;
                                                                                                                                                                                                                                                                     Pred. No. 0; .
0; Mismatches 73; Indels
             NAME: BERKSTRESSER, JERRY W
REGISTRATION NUMBER: 22,651
REFERENCE/DOCKET NUMBER: JWB-1186
TELECOMMUNICATION INFORMATION:
                                                                        TELEPHONE: (703) 415-0810
TELEPAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 6:
SEQUENCE CHARACTERISTICS:
LENGTH: 9323 base pairs
TYPE: nucleic acid
                                                                                                                                                                                       TOPOLOGY: linear MOLECULE TYPE: DNA (genomic)
ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                                                                                Matches 4864; Conservative
                                                                                                                                                                           single
                                                                                                                                                                                                                                                                     Similarity
                                                                                                                                                                       STRANDEDNESS:
                                                                                                                                                                                                                   US-08-530-198-6
                                                                                                                                                                                                                                                       Query Match
                                                                                                                                                                                                                                                                                                                 ö
                                                                                                                                                                                                                                                                                                                                                                                                          a
                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      P
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    염
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
```

```
961 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG 1020
                                                                                                                                                                                                 1021 ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACCATCAGGGAT 1080
                                                                                                                                                                                                                                                                  1461 ATTAGCGTAAATGGTGGCAGCATTCTTTACTCGCAGGCAAAAAATCACCATCAGCGAT 1520
                                                                                                                                                                                                                                                                                                             1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATCTG 1140
                                                                                                                                                                                                                                                                                                                             1141 GGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA 1200
                                                                                                                                                                                                                                                                                                                                                                                            1201 GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                             1641 GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 1700
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1261 AAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1321 GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1441 GGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAGGCTCAACCATCAATGTATCAGGC 1500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1881 GGCATTCAATTAGCAAAGAAACCTCTTTAGAAAAGGCTCAACCATCAATGTATCAGGC 1940
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1501 AAAGAAAAAGGCGGACGCGTATTGTGTGGGGGCGATATTGCGTTAATTGACGGCAATATT 1560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1561 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTTGTGGAGACATCGGGGCAT 1620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             2001 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT 2060
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             2121 GATGTAACAATTGAAGCCGAAGACCCCTTGGCAATAATACCGGTATAAATGATGAATTC 2180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1861 AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT 1920
                                                                                                                   901 TICACCTICGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAAICACGGTITAAII 960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1621 IATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1681 GATGTAACAATTGAAGCCGAAGACCCCCTTCGCAATAATACCGGTATAAATGATGATTC 1740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1801 ACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCATCA 1860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1741 CCAACAGGCACCGGTGAAGCAAGGGACCCTAAAAAAAATAGCGAACTCAAAACAACGCTA 1800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
                                                                                  qq
                                                                                                                 ŏ
                                                                                                                                                q
                                                                                                                                                                                                             QQ
                                                                                                                                                                                                                                                δλ
                                                                                                                                                                                ŏ
                                                                                                                                                                                                                                                                                                             ŏ
                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                            ö
                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     d
                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
```

2360	98	04	10	2160	2220	2280	2340	2400	2460	2520	2580	2640	2700	2760 3200	2820	2880	2940	3000
AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT	TAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCG 	TAACCATTTATTCTGGCGGATGGGTTGATCTTCATAAAAATTAGGCTTGATCA 	TTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAATAACAAAGCACG 	GACGCGGCAAATGCTAAAATTGTCGCCCAGGGCACTGTAACCATTACAGGAGGGAAAA 	GATTICAGGGCTAACAACGTAICTITAAACGGAACGGGTAAAGGICTGAATAICATITCA 	TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA	ATTAACCAAACTACGAGAAAGAACGTCGTATTGGCAAACCAGGCATGATTCGCACTGG 	AACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAATACATTTCA 	AGCAATAGCAAAGGCTTAACAACACAGTATAGAAGCTCTGCAGGGGTGAATTTTAACGGC	GTAAATGGCAACATGTCATTCAATCTCAAAGAAGGAGGGAAAGTTAATTTCAAATTAAAA 	CCAAACGAGAACATGAACACAAGCATTTACCAATTCGGTTTTTAGCAATTCACA	GCCACTGGTGGGGGCTCTGTTTTTTGATATATATGCCAACCATTCTGGCAGAGGGCT 	GAGTTAAAAATGAGTGAAATTAATGTCTAAGGGGGGGTAATTTTACGTTAAATTCCCAT 	GTTCGCGCCATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTGA 	AATITCAGCCICAGACAAAGAGATGATTITTATGACGGGTACGCACGCAATGCCATC 	AATICAACCTACAACATATCCATTCTGGGCGGTAAIGTCACCCTTGGTGGACAAAACTCA 	AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCCCTAGAAGCCCTAGAAGCCCTAGAAGCCCTAGAAGCAGCAAATGTTACGGGGAATATTACTATCGAGAAAGCAGCAAATGTTACGCTAGAAGCC	AATAACGCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC 
2301	1921	9 4	2041	2101	2161 2601	2221 2661	2281 2721	2341	2401	2461 2901	2521 2961	2581 3021	3081	2701 3141	2761 3201	2821 3261	2881 3321	2941 3381
QQ	QY	QY	Qy Db	QY Dp	Qy Db	Qy Db	Qy Db	Qy	Qy	Oy Db	Qy Db	Oy Db	Qy Db	Oy Db	Qy Db	Qy Db	Oy Dp	Qy Db

Qy Ph	3001	GTTAATGGGAGTTTAAGTTTAACTGGCGAAAATGCAGATATTAAAGGCAATCTCACTATT 3060 
δy	90	CAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACGGCAATTTT 312
QQ	3501	26
Qy Dp	3121	FT 3
oy.	18	CCAATGATGGTGATTTAAACATTACCACTCACGTAAACGCAACCAAAGAAGAATCATC 324
QQ	3621	89
οy	3241	GCGGAGATATAATCAACAAAAAAGGAAGCTTAAATATTACAGACAG
Dp	3681	GGCGGAGATATAATCAACAAAAAGGAAGCTTAAATTTACAGACAG
δy	3301	CGGCAATATCTCGCAAAAAGGCAACCTCACGATTCTTCCGA
qq	3741	AAATCCAAATTGGCGCAATATCTCGCAAAAGAAGG
ΟY	3361	GACTCT
qq	3801	FANTATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGGAGGGCT
٥y	3421	TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCCAAAGAATTGAAATTGACAGAA 3480
qq	3861	CAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA 392
Οy	3481	GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 3540
Dp	3921	ACCTAAGTATTTCAGGTTTCAATAAAGCAGAGTTACAGCCAAAGATGGTAGAGATTTA 398
οy	3541	ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3600
qq	3981	CTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 404
٥y	3601	AAIGITAAAGATTCAAAAATCICTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 3660
Db	4041	STTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 410
Οy	3661	AAAACAICTAGCAGCAATGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3720
Ор	4101	NICTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 416
οy	3721	TTACTGCAAAAAATGTAGAAGTAAAGCAAAGATATTACTTCTCTCAAAACAGTAAAATATC 378
qq	4161	ACTECCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC 422
οy	3781	GCAAA 384
QQ	4221	GGGGTCGGAAAAGGTTACCACCACAGCTCGACCATTAACGCAACAAATGG
Oy	3841	CGGTACGATTTCCGGTAACACGGTAA
Db	4281	CAAGTATTACAACCAAAACAGGTGATATCAGCGGTACGATTTCCGGGTAACAGGTAAGT 4
ΟY	3901	GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960
QQ	4341	ACCCCACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGG
δλ	96	05
Dp	0	GCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGT
QY	4021	AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080 [11]
		70.4 4.740.701.444.444.474.700.700.714.714.714.714.714.714.714.714.714.714

```
4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTTACTGAAGCCGGTTCTAGC 4140
                       4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACACTAAATGGGTTA 4440
                                                                                                                                                                                                                                                                                                                                                                                                                                                     4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAAACATTAGCTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                              4581 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4640
                                                                                                                                                                        4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                                                                               4261 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                                    4701 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4760
                                                                                                                                                                                                                                                                                                                                              4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCCCTTAAGAGGCAAGGAAATTGAGGTG 4500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     4741 GCCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        5181 GCCCCACCACTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 5240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTTACTGTGTGGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4861 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                TITLE OF INVENTION: High Molecular Weight Surface Proteins TITLE OF INVENTION: of No. 5876733-Typeable Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  2001 Jefferson Davis Hwy., 1203 Crystal Plaza
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Barenkamp, Stephen J.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Sequence 6, Application US/08469880 Patent No. 5876733 GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     5361 AACAGGTTATTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             NUMBER OF SEQUENCES: 8
CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ADDRESSEE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             APPLICANT:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         US-08-469-880-6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            STREET:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     5001
                                                                                                                                                                                                                                                                                                      Ω
                                                                                                                                                                                                                                                                                                                                                                                      a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          В
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ŏ
                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                  õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ŏ
```

```
121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTTCATCTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGGCAAGAATGAAGAGGGGGGGTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             421 CGGGGTTGTGACCATTCCACAGAAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    61 CACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCCGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     501 CACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCCGCCATATAA 560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             97.6%; Score 4820.2; DB 2; Length 9323; 98.5%; Pred. No. 0; tive 0; Mismatches 73; Indels 0;
                                                                                                                                                               Patentin Release #1.0, Version #1.30
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1038-516 MIS:vg
                                                                                                                                                                                                                                                                                                                          WUMBER: US PCT/US93/02166
16-MAR-1993
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CURRENT APPLICATION DATA:
APPLICATION NUMBER: US/08/469,880
FILING DATE: 06-UN-1995
                                                                                                                                                                                                                                                                                                                                                                             US 08/302,832
                                                                                                                                                                                                                                                                     APPLICATION NUMBER: GB 9205704.1 FILING DATE: 16-MAR-1992
                                                                                                                         IBM PC compatible
SYSTEM: PC-DOS/MS-DOS
                                                                                                                                                                                                                                                                                                                                                                                                                                     NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    REFERENCE/DOCKET NUMBER: 10
TELECOMMUNICATION INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     MOLECULE TYPE: DNA (genomic)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     TELEPHONE: (703) 415-0810
TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 6:
                                                                                                                                                                                                                                                                                                                                                                                             FILING DATE: 16-SEP-1994
ATTORNEY/AGENT INFORMATION:
                                                                                                          Floppy disk
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  9323 base pairs
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Matches 4864; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    single
                                                                                                                                                                                                                                                                                                           PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                     PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                            PRIOR APPLICATION DATA:
                                                                                    COMPUTER READABLE FORM:
                                                                                                                                                                                                                                                                       APPLICATION NUMBER:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                nucleic acid
                                                                                                                                                                                                                                                                                                                        APPLICATION NUMBER:
                                                                                                                                                                                                                                                                                                                                                                                 APPLICATION NUMBER:
                                                                                                                                             OPERATING SYSTEM:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     linear
Bldg. 1
               Arlington
                                                     22202-0286
                                   Virginia
                                                                                                                                                                                                                    FILING DATE: 06
CLASSIFICATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  STRANDEDNESS:
                                                                                                        MEDIUM TYPE:
                                                                                                                                                                                                                                                                                                                                            FILING DATE:
                                                                                                                             COMPUTER:
                                                     COUNTRY:
                                                                                                                                                                 SOFTWARE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         US-08-469-880-6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  LENGTH:
 STREET:
                 CITY: A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏ
```

ö

1620	1680 2120	1740	1800	1860	92 36	1980	2040	0 4	16	9	· ·	2340	O ==	2460 2900	252 296	2580 3020	3080
AACGCTCAAGGTAGTGGTGATATCGCTAAA 	TATTTATCCATTGACAGCAATGCAATTGTTAAAACAA 	1 GATGTAACAATTGAAGCCGAAGACCCCCTTCGCAA 	1 CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAATAGCGAACT 	AACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAAI 	AAAACTTACGGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAAT 	aaaggtcagcgtgcggaggcgttcagattgatggagatattaltt 	81 AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 	41 GGTTTTTTAAATATTACGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 	0-0	61 0	21 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAAC 11 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACG 1 TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAAC	81 /	41 AACGTCAGTGCTCTTAATCTAGAGACAGGCGCAAATTTTACCTTTATTAAATACATTT 	01 4	61 (	21 6	81 GCCACTGGTGGGGGCTCTGTTTTTTGATATATATGCCAACCATTC 11111111111111111111111111111
156	162	168		180	186	192					9 13	7 7	23,	24	24	25	30
Qy	Qy Db	Qy	QY	Qy	Qy Db	Qy	Qy	Qy	QY	Oy Db	Oy Db	QY	Qy	QY	Qy	Qy	QY

TTACGGGGAATATTACTATCGAGG CTAATCAGCAAAACATAAGGGATA

```
4161 ATTACTGCAAAAAATGTAGAAGTAAACAAAGGATATTACTTCTCTCAAAACAGTAAATGC 4220
                                          3781 ACCGCGTCGGAAAAGGTTACCACCACAGCTCGACCATTAACGCAACAAATGGCAAA 3840
                                                          3841 GCAAGTATTACAACCAAAAAGGGTGATATCAGGGGTACGATTTCCGGTAACACGGTAAGT 3900
                                                                                                                                                          3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGGT 3960
                                                                                                                                                                                                               3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                                                                                                                                                                4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080
                                                                                                                                                                                                                                                                                      4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTGCAAGCCGGTTCTAGC 4140
                                                                                                                                                                                                                                                                                                                                             4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                                                                                                                                                                                                                                                                                                  4581 ATCACTTCAACTAAGGGTCAGGTAGACTCTTGGCTCAGAATGGTAGCATGCAGGAAGC 4640
                                                                                                                                                                                                                                                                                                                                                                                                                                          4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                                                                                                                                                                                                                                                                                                                                         4261 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      4501 AAATATTCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAGAAACATTAGCTAAACTTGGTGAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              5001 GAAAAACTAAAAGATTTATCTGATGAAGAAAGAAACATTAGCTAAACTTGGTGTAAAGT 5060
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              5061 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAAATGAATTTACA 5120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4801 GTAGATTTCATCCTGCAATGAAGTCATTTATTTTCGTATTATTTACTGTGGGGTTAAA 4860
               g
                                                                     Q
                                                                                                   ò
                                                                                                                                                        ò
                                                                                                                                                                                   g
                                                                                                                                                                                                              à
                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                        δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ó
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Qγ
```

, 5

```
g
                                          Q
                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                        ΟŻ
                                                                                                                                Ω
                                                                                                                                                                                       Ω
                                                                                                                                                                                                                                                 òχ
                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                             óλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ö
                         0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Query Match 97.6%; Score 4820.2; DB 2; Length 9323; Best Local Similarity 98.5%; Pred. No. 0; Matches 4864; Conservatuse 0; Mismatches 73; Indels 0;
                                                                                                                                                                                                                            APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
TITLE OF INVENTION: of No. 5928651-Typeable Haemophilus
NUMBER OF SEQUENCES: 10
CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       73; Indels
                                                                                                                                                                                                                                                                                                        ADDRESSEE: Shoemaker and Mattare, Ltd.
STREDT: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREDT: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                           SOFTWARE: Patentin Release #1.0, Version #1.30
CURRENT APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              APPLICATION NUMBER: US PCT/US93/02166 FILING DAME: 16-MAR.1993
PRIOR APPLICATION DATA: APPLICATION NUMBER: GB 9205704.1
FILING DATE: 16-MAR-1992
ATTORNEY/AGENT INPORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                APPLICATION NUMBER: US/08/728,470
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        US 08/302,832
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1038-633
                                                                                                                                                                                                                                                                                                                                                                                                                         MEDIUM TYPE: Floppy disk
COMPUTER: IBM PC compatible
OPERATING SYSTEM: PC-DOS/MS-DOS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    NAME: Berkstresser, Jerry W
REGISTRATION UNBER: 22,651
REFERENCE/DOCKET NUMBER: 1038-
TELECOMMINICATION INFORMATION:
TELEPHONE: (703) 415-0810
INFORMATION FOR SEQ 1D NO: 6:
SEQUENCE CHARACTERISTICS:
LENGTH: 9323 base pairs
                                                                                                                                                                                      Sequence 6, Application US/08728470 Patent No. 5928651
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ; TOPOLOGY: linear
; MOLECULE TYPE: DNA (genomic)
US-08-728-470-6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     16-MAR-1993
                                                                                    4921 AACAGGTTATTATTG 4937
                                                                                                   5361 AACAGGTTATTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        nucleic acid
DNESS: single
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 PRIOR APPLICATION DATA:
APPLICATION NUMBER: U
                                                                                                                                                                                                                                                                                                                                                                                                          COMPUTER READABLE FORM:
MEDIUM TYPE: Floppy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           CLASSIFICATION: 424
PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        APPLICATION NUMBER:
                                                                                                                                                                                                                                                                                                                                               CITY: Arlington
STATE: Virginia
COUNTRY: U.S.A.
                                                                                                                                                                                                                                                                                                                                                                                           22202-0286
                                                                                                                                                                                                                  GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     FILING DATE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     STRANDEDNESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               FILING DATE:
                                                                                                                                                                          -08-728-470-6
                                                                                                                                                       RESULT 13
                                                     qq
                                                                                                           Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                    οy
```

```
1021 ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGCAAAAAATCACCATCAGCGAT 1080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1461 ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGCCAAAAATCACCATCAGCGAT 1520
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATCTG 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1141 GGCGATATTTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCCACTATTCGAAACCAA 1200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    981 CAATCTGTTTTAGCAAGCGGCAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTAC 1040
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   781 GGACAAGTCTTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                           481 CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACACCACTATG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  601 CAAGTAGATGGTAATAAAACCATTATCGGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       721 GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAAT 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       901 TTCACCTTCGAGCAAACCAAAGATAAAGGCGCTCGCTGAAATTGTGAATCACGGTTTAATT 960
                        181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT 240
                                                                                                                                                                                    241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGCCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                         361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     421 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAAC 480
121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              661 CAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC
```

Oy Dp	1201	GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGCGGCAATATTGTTCTTTCCGCC 1260 	
Q Dp	1261	AAAGAGGGTGAAGCGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 1320 	
Qy Db	1321 1761	GCCAAGCTGATGATACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1380 	
Qy Db	1381	TCAGGTAAAGAAGGGGAAAACTTACCTTGGCGGTGACGAGGGGGGAGGTAAAAAC 1440 	
Qy Dp	1441	GGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAGGCTCAACCATCAATGTATCAGGC 1500 	
o o	1501	AAAGAAAAAGGGGGGGCGGTATTGTGGGGGGGATATTGCGTTAATTGAGGCAATATT 1560 	
Qy Dp	1561	AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGAGACATCGGGGCAT 1620 	
Oy Db	1621 2061	TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680 	
O.Y	1681 2121	GATGTAACAATTGAAGCCGAAGACCCCTTCGCAATAATACCGGTATAAATGATGAATTC 1740 	
Qy Db	1741	CCAACAGGCACCGGTGAAGCAAGCGACCCTAAAAAAATAGCGAACTCAAAACGACGTA 1800 	
Oy Db	1801	ACCAATACAACTATTTCAAATTATCTGAAAAGGCCTGGACAATGAATATAAGGGCATCA 1860 	
Oy Dp	1861	AGAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT 1920 	
Oy Dp	1921	AGTAAAGGTCAGCGTGGCGGGGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA 1980 	
Oy Dp	1981	AATTTAACCATTTATTCTGGCGGATGGGTTGATGTTCATAAAAATATTACGCTTGATCAG 2040 	
Qy Dp	2041	GGTTTTTTAAATATTACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGCACGC 2100 	
oy Ob	2101 (2541 (	GACGCGGCAAATGCTAAAATTGTCGCCCAGGCACTGTAACCATTACAGGAGAGAGA	
λά G	2161 (	GATTTCAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCATTTCA 2220 	
λς qo	2221	TCAGTGAATAATTTAACCCACAATCTTAGTGGCACAATTAACATATCTGGGAATATAACA 2280 	
ά	2281 /	23	

€

2780	2400	2460	2520	3020	3080	3140	2760 3200	2820 3260	3320	3380	3000	3060	3120	3180 3620	3240	3300	3360	3420
	2341 AACGTCAGTGCTCTTAATCTAGACACAGGCGCAAATTTTACCTTTATTAATACATTTCA 	2401 AGCAATAGCAAAGGGTTAACAACAGTATAGAAGGTCTGCAGGGGTGAATTTTAACGGC 	2461 GTAAATGGCAACATGTCATCAATCTCAAAGAAGGAGCGAAAGTTAATTTCAAATTAAAA 1111111111111111111111	2521 CCAAACGAGAACATGAACACAAGCATTTACCAATTCGGTTTTTAGCCAATATCACA 	2581 GCCACTGGTGGGGCTCTGTTTTTTGATATATATGCCAACCATCTGGCAGGGGGCT	2641 GAGTTAAAATGAGTGAAATTAATATCTCTAACGGGGCTAATTTTACCTTAAATTCCCAT	2701 GTTCGCGGCGATGACGCTTTTAAAATCAACAAAGACTTAACCATAAATGCAACCAATTCA 	2761 AATTTCAGCCTCAGACAAAGATGATTTTTATGACGGGTACGCAGCCAATGCCATC	2821 AATTCAACCTACAACATATCCATTCTGGGCGGTAATGTCACCCTTGGTGGACAAAACTCA 	2881 AGCAGCAGCATTACGGGGAATATTACTATCGAGAAAGCAGCAATGTTACGCTAGAAGCC	2941 AATAACSCCCCTAATCAGCAAAACATAAGGGATAGAGTTATAAAACTTGGCAGCTTGCTC	3001 GTTAATGGGAGTTTAAGTTTAACTGGGGAAAATGCAGATATTAAAGGCAATCTCACTATT 	3061 TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTT	3121 ACCAATAATGGCACTGCCGAAATTAATAACACAAGGAGTGGTGAAAACTTGGCAATGTT	3181 ACCAATGATGATGATTTAACATTACCACTCACGCTAAACGCAACCAAGCAAG	3241 GGCGGAGATATAATCAACAAAAAGGAAGCTTAAATATTACAGACAG	3301 GAAATCCAAATTGGCGGCAATATCTGGCAAAAGAAGGCAACCTCACGATTCTTCCGAT 	3361 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGGGGCTCTAGT
qq	Qy	Qy Db	Qy Db	Oy Dp	Oy Dp	9y Dp	Qy Db	Qy Db	Qy Db	Qy Db	Oy Db	Qy	Qy Db	Qy Dp	Qy Db	Qy Dp	QQ Dp	ΟŊ

```
4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4881 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4940
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4261 GATATTAAAGCAACCAGCGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4141 ATCACTICAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGC 4200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  4081 GAAGGAGCTGCAACCTTAACCGCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGC 4140
                                                                                                                                                                                                                                                                                                                                                                                                                                 4281 GCAAGTATTACAACCAAAACAGGTGTATCAGCGGTACGGTTACCGGTAACACGGTAAGT 4340
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCCGGTAATACGGTA 4020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGACA 4080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                3841 GCAAGTATTACAACCAAAACAGGTGATATCAGGGGTACGATTTCCGGTAACACGGTAAGT 3900
                                                                                                                                                                                                                                                                                                                                                            3781 ACCGCGTCGGAAAAGGTTACCACACCACAGCTCGACCATTAACGCAACAAATGGCAAA 3840
                                                                                                                                                                                                             3661 AAAACATCTAGCAGCAATGGCGGACGTGAAAGCAATAGCGACAACGATACCGGCTTAACT 3720
                                                                                                                                                                                                                                                                                                      3721 ATTACTGCAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAATATC 3780
                                                                                                                                                                                                                                                                                                                     3541 ACTATTGGCAACAGTAATGACGGTAACAGCGGTGCCGAAGCCAAAACAGTAACTTTTAAC 3600
                                                                                                                                                        3601 AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAATGTGACACTAAATAGCAAAGTG 3660
                                                                                                                                                                                                                                                                 3481 GACCTAAGTATTTCAGGTTTCAATAAAGCAGAGATTACAGCCAAAGATGGTAGAGATTTA 3540
                                                                                               3801 AAAATTAATATCACCAAACAGATAACAATCAAAAAGGGTATTGATGGAGAGGACTCTAGT 3860
                           3421 TCAGATGCGACAAGTAATGCCAACCTAACTATTAAAACCAAAGAATTGAAATTGACAGAA 3480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4701
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4201
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Óγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
```

qq ò

qq

q

Ω δý

g ò qq ŏ Dp ò

οy

q õ

ρý

```
4861 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                                                                                                                                                                                                                                                                                                                  5301 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAAGTATTTT 5360
                                                                                                                                                                                       4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                          4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTCAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                        4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAĀTTTACA 4680
                                                                                                                                          4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGCGAAACGCGTCCTT 4560
                                                            4561 GAAAAAGTAAAAGATTATCTGATGAAGAAAGAAAAAATTAGCTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
TITLE OF INVENTION: Of No. 5977336-Typeable Haemophilus
NUMBER OF SEQUENCES: 11
CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         YSTEM: PC-DOS/MS-DOS
PatentIn Release #1.0, Version #1.30
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      US PCT/US93/02166
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         FILING DATE: 05-OCT-1994
PRIOR APPLICATION DATA:
APPLICATION NUMBER: US PCT/US93/021
FILING DATE: 16-MAR-1002
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 REFERENCE/DOCKET NUMBER: 1038-557
TELECOMMUNICATION INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CURRENT APPLICATION DATA:
APPLICATION NUMBER: US/08/617,697
FILING DATE: 01-APR-1996
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Sequence 6, Application US/08617697 Patent No. 5977336
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              COMPUTER READABLE FORM:
MEDIUM TYPE: Floppy disk
COMPUTER: IBM PC compatible
OPERATING SYSTEM: PC-DOS/MS-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       703) 415-0810
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    FILING DATE: 16-MAR-1993
ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (703) 415-0813
                                                                                                                                                                                                                                                                                                                                                                                                                                                        4921 AACAGGTTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             5361 AACAGGTTATTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Patent No. 5977336
GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   STATE: Virginia COUNTRY: U.S.A. ZIP: 22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Arlington
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           FILING DATE: 0 CLASSIFICATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       TELEPHONE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             RESULT 14
US-08-617-697-6
                                                                                                                                                                                                                                                                                                                                                              QQ
                                                                                                                                                                                                                                                                                                                                                                                              ŏλ
                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                              δλ
                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                  δý
                                                                                                                                                                                                                                                                                                QQ
                                                                                                                                                                                                                                                                                                                                Ω
                                                                                                       q
                                                                                                                                       δŏ
                                                                                                                                                                     g
                                                                                                                                                                                                    δλ
               οy
                                         q
                                                                         QΫ́
```

TELEFAX:

; 0

```
61 CACCTITITIGCAGICTATATGCAAATATTITAAAAAATAGTATAAATCGGCCATATAA 120
                                                                                                                                                                                              121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                         181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT 240
                                                                                                                                                                                                                                                                                  241 CACATGAAATGATGAACCGAGGGAAGGGAGGGAGGGCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                            0; Gaps
                                                                                                                                         301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                                                                                                                       981 CAATCTGTTTTAGCAAGCGGCAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTAC 1040
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                                                                                                                421 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                         481 CACTTAGGGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACGGCACTATG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           601 CAAGTAGATGGTAATAAAACCATTATCCGCAACAGTGTTGACGCTATCATTAATTGGAAA 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     661 CAATTTAACATGGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAACAACAACTCCGCC 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                721 GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTTAGATTCTAAC 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          781 GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   841 ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAAT 900
                                                                                                  97.6%; Score 4820.2; DB 2; Length 9323; 98.5%; Pred. No. 0; tive 0; Mismatches 73; Indels 0;
                                                                                                                           73; Indels
                                                                 ; MOLECULE TYPE: DNA (genomic)
US-08-617-697-6
INFORMATION FOR SEQ ID NO: 6: SEQUENCE CHARACTERISTICS:
                   LENGTH: 9323 base pairs
TYPE: nucleic acid
STRANDEDNESS: single
                                                                                                                   Matches 4864; Conservative
                                                         linear
                                                                                                             Similarity
                                           STRANDEDNESS
                                                        TOPOLOGY:
                                                                                                 Query Match
                                                                                                                                                              g
                                                                                                                                                                                   ò
                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                 q
                                                                                                                                                                                                                            á
                                                                                                                                                                                                                                                                      õ
                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                              a
                                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                       Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ô
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    õ
```

```
961 ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG 1020
                                                         1021 ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGGCAAAAAATCACCATCAGGGAT 1080
                                                                                                   1081 ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCCTGAAAATGAAGCGGTCAATCTG 1140
                                                                                                                                                                               1141 GGGGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCTGCTATTCGAAACCAA 1200
                                                                                                                                                                                           901 ITCACCITCGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGITTAATT 960
                                                                                                                                                                                                                          1201 GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGGCGCCAATATTGTTCTTTCCGCC 1260
                                                                                                                                                                                                                                      1261 AAAGAGGGTGAAGGGGAAATTGGCGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 1320
                                                                                                                                                                                                                                                                                 1321 GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1380
                                                                                                                                                                                                                                                                                                                                1761 GGCAAGCTGATGATAAAGTCCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 1820
                                                                                                                                                                                                                                                                                                                                                             1441 GGCATTCAATTAGCAAAGAAACCTCTTTAGAAAAGGCTCAACCATCAATGTATCAGGC 1500
                                                                                                                                                                                                                                                                                                                                                                                                                    1501 AAAGAAAAAGGCGGACGCCTATTGTGTGGGGCGATATTGCGTTAATTGACGGCAATATT 1560
                                                                                                                                                                                                                                                                                                                                                                                                                                                                1941 AAAGAAAAAGGGGGACGCGCTATTGTGTGGGGCGATATTGCGTTAATTGACGCGCAAPATT 2000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1561 AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTTGTGGAGACATCGGGGCAT 1620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1621 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1681 GATGTAACAATTGAAGCCGGAAGACCCCCTTCGCAATAATACCGGTATAAATGATGAATTC 1740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1121 GATGTAACAATTGAAGCCGAAGACCCCCTTCGCAATAATACGGTATAAATGATGAATTC 2180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1801 ACCAATACAACTATTTCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCATCA 1860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            2241 ACCAATACAACTATTTCAAATTATCTGAAAAAGGCCTGGACAATGAATATAAGGGCATCA 2300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1861 AGAAAACTTACCGTTAATAGCTCAATCAACATCGGAAGCAACTCCCACTTAATTCTCCAT 1920
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1921 AGTAAAGGTCAGCGTGGCGGAGGCGTTCAGATTGATGGAGATATTACTTCTAAAGGCGGA 1980
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1981 AATTIAACCATTATTCTGGCGGATGGGTTCATGTTCATAAAATATTACGCTTGATCAG 2040
                     QQ
                                            ò
                                                                  qq
                                                                                        ò
                                                                                                            q
                                                                                                                                    ò
                                                                                                                                                        QQ
                                                                                                                                                                              δ
                                                                                                                                                                                                  Ob
                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                            ģ
                                                                                                                                                                                                                                                                                                                 ŏ
                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                              à
                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                        δy
                                                                                                                                                                                                                                                                                                                                                                                                                            Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                   à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               gΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δλ
```

4 4 7 1 9 7 9 7	3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	96 02 02 08 08 14 17 20	2820 3260 2880 3320 2940 3380 3440 3500 3120
AATTTAACCATTTATTCTGGCGGATGGGTTGATCATAAAAATATTACGCTTGATCAG GGTTTTTAAAATATTACGGCGGATGGGTTGATGATGATGAAAAATATTACGCTTGATCAG GGTTTTTTAAATATTACGGCGGTTGGTTGATGTTTTGAAGGTGGAAATAACAAAGGCACGG GGTTTTTTAAATATACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAGGCACGG GACGCGGCAAATATACCGCCGCTTCCGTAGCTTTTGAAGGTGGAAATAACAAAAGGCACGGCGGCAAATTTTAAAATTTCAGGGCTAAAAATTGTCGCCCAGGGCACTGTAACCATTACAGGAGGGAAAA GATTTCAGGGCTAACAACGTATCTTTAAACGGAACGG	TTAACCAAACTAGGGGAAAACCCCGTATTGGCAAACCAGCCATGATTGGCAAACTAGGGAAAAACTGCTGTATTGGCAAACCAGCCATGATTGGCAAACCAGCCATGATTGGCAAACCAGCCATGATTGGCAAACCAGCCATGATTGGCAAACCAGCCATGATTGGCAAACCAGCCATGATTGGCAAACCAGCCATGATTGGCAAACCATGATTGGCAAACCATGATTGGCAAACCATGATTAGAATACATTTGGCAAACCATGATTAAAATACATTTGGCAAATTTTAACCTTTAATAAATA	AAATGGCAACATGTCATTCAATGTCAAAGAAGAGGGGGAAAGTTAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTCAAATTTAAAAAGAAAAAAAA	AATTTAAGCCTCAGACGAAGATGATTTTATGACGGTACCCCCCACGCAATGCCATC AATTTCAGCCTCAGACGAAGATGATTTTATGACGGTACCCCCCACGCAATGCCATC AATTTCAGCCTCAGACGACGAAGATGATTTTATGACGGTACGCACCCCACCCCACCCCACCCA
2421 2041 2481 2101 2541 2601 2601	4 8 4 7 3 4 2 8 6 4 6 9 6 9 6 9 6 9 6 9 6 9 6 9 6 9 6 9	90 90 90 90 90 90 90 90 90 90 90 90 90 9	2761 3201 2821 3261 2881 3321 2941 3381 3411
		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

3560 3180 3620	3240	3300	φō	3420	348	3540	36	3660	9	2 8	3840	ω 4	3960	9	4080	4140	4200
GCAATTTT GCAATGTT 	GCATCATC 	ATGATGCT             ATGATGCT	TTCTTCCGAT	GACTCTAGT              GACTCTAGT	TGACAGAA 	FGGTAGAGATTTA 	CTTTTAAC 	GCAAAGTG              GCAAAGTG	GCTTAACT	TAAATATC            TAAATATC	ATGGCAA!             ATGGCAA!	CGGTAAGT           CGGTAAGT	CGAAATCGGGT 	GTAATACGGTA 	ATGCGACA 	GGTTCTAGC	CAGGAAGC                     CAGGAAGC
FAAATATCACCG FGGTAAAACTTG	GGAACCAAAGAAGCA 	CAGTAATA              CAGTAATA	ACGAT            ACGAT	SAGAG        SAGAG	rgaaat         Gaaat	CAAAGATGGTA 	AACAGTAA             AACAGTAA	ACTAAATA             ACTAAATA	CGATACCG(            CGATACCG(	CAAAACAG 	CGCAACAA                CGCAACAA	CGGTAACA          CGGTAACA	GAAG        GAAG	0 - 0	AGAAATTA             AGAAATTA	TGAAGCCG           TGAAGCCG	TAGCATCGC2                TAGCATCGC2
CCT AGT	A - A	ATTACAGACAGTAATAAT 	CGCAAAAGAAGCAACCTC. 	CACCAAACAGATAACAATCAAAAAGGGTATTGATG 	ACCAAAGAATTGA 	ACAGCCAA              ACAGCCAA	GAAGCCAA               GAAGCCAA	AATGTTAAAGATTCAAAAATCTCTGCTGACGGTCACAAATGTGACACTAAATAGCAAAGT 	AAAACATCTAGCAGCAATGGGGGGGGGGGAAAGCAATAGGGACAACGATAC( 	GCAAAAAATGTAGAAGTAAACAAAGATATTACTTCTCTCAAAACAGTAAAT. 	GAAAAGGTTACCACCACAGGAGGTCGACCATTAACGCAACAAATGGCAAA 	GTACGATTTCCGGTAACAC 	TCAAAAATT             TCAAAAATT	GGTACAATTTCC 	GGGAATGGCGCAGAAATTAAT 	CTTGACTACTGAAGCC 	GCTCAGAATGGTAGCAT 
AAAGACTAGAGATAC FAATATAACACAAGG 	CACTCACGCT	GCTTAAATA 	aaaaagaa              aaaaagaa	TCAAAAAG             TCAAAAAG	CCTAACTATTAAAACC 	CAGAGATT               CAGAGATT	GCGGTGCC	ACGGTCAC               ACGGTCAC	AAAGCAAT              AAAGCAAT	AAGATATT           AAGATATT	CAGGCTCG               CAGGCTCG	TCAGCGGT          TCAGCGGT	AATCCGGCTC                 AATCCGGCTC	CAATTGGC              CAATTGGC	TTTAACAGTTGGG 	GGAATACC 	TCTTGGCT          TCTTGGCT
AAAGGAAAGA GAAATTAATA 	AAACATTACCA 	<u> </u>	CAATATCTCGC 	GATAACAA          GATAACAA	CCAACCTAA 	TTTCAATAAAGCAGAGATTAC. 	CGGTAACA             CGGTAACA	CTCTGCTG 	CGGACGTG         CGGACGTG	AGTAAACA             AGTAAACA	CACCACAG              CACCACAG	ATTACAACCAAACAGGTGATATCAGCG 	GATTTAACCACTAAATCCG( 	GAGCTAATGTAACAAGTGCAACAGGTACAATTGGC 	CGATTTAA               CGATTTAA	GAAGGAGCTGCAACCTTAACCGCAACAGGGAATAC 	ACTTCAACTAAGGGTCAGGTAGACTTCTGG 
ACTTTT ACTGCC	GGTGATTTAAA               GGTGATTTAAA	ATCAACAA           ATCAACAA	GGGGCAA'              GGGGCAA'	ACCAAACA          ACCAAACA	AGTAATGC          AGTAATGC	TCAGGTTT         TCAGGTTT	AGTAATGA           AGTAATGA	TCAAAAAT            TCAAAAAT	AGCAATGG             AGCAATGG	AATGTAGA          AATGTAGA	AAGGTTAC             AAGGTTAC	ACCAAAAC,               ACCAAAAC,	367	ACAAGTGC            ACAAGTGC	SCAAACGCTGGCGATT 	ACCTTAAC	AAGGGTCA(            AAGGGTCA(
AGAAAGCGCC. CAATAATGGC. 	SAT	SCGGAGATATAATO 	ICCAAATTGGCGGC 	ATAT	SCGAC               SCGAC	raagtatttcaggt 	TTGGCAAC           TGGCAAC	FTAAAGAT          FTAAAGAT	CATCTAGC 	ACTGCAAAA 	GTCG	STATTACA           STATTACA	GCGACT	CTAATGTA 	GTTACGGCA. 	SAGCTGCA.	TTCAACT
TCAG ACCA 1111 ACCA	ACCAAT(	00000	GAAATC         GAAATC	AAAATTA             AAAATTA	TCAGATO	GACCTA           GACCTA	ACTA'        ACTA'	AATG       AATG	AAAA(	ATTA       ATTA	ACCGC         ACCGC	GCAAGTA           GCAAGTA	GTTAG       GTTAG	GAGG(         GAGG(	AATG        AATG	GAAG(           GAAG(	ATCA(       ATCA(
3501 3121 3561	3181	3241	3301	3361	3421	3481	3541		3661	3721	3781 4221	3841	3901	3961	4021	4081	4141
Db Qy Db	Qy Db	Qy	Qy	Qy Db	Qy	Qy	Qy	Qy	Qy	Qy Db	Qy	Qy	Qy	Qy	Qy Db	Qy Db	Qy

```
4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACCGTGGCAGGCTCG 4260
                                                                          4261 GATATTAAAGCAACCAGGGCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4320
                                                                                                              4701 GATATTAAAGCAACCAGCGCCACCTTGGTTATTAACGCAAAAGATGCTAAGCTAAATGGT 4760
                                                                                                                                                  4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAACGCAAGCGGCTCTGGTAGTGTG 4380
                                                                                                                                                                                                                             4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTA 4440
                                                                                                                                                                                                                                                                                                                              5001 GAAAAGTAAAAGATTATCTGATGAAGAAGAGAAACATAGCTAAACTTGGTGAAGT 5060
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4861 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTT 4920
                                                                                                                                                                                                                                                                                                         4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTG 4500
                                                                                                                                                                                                                                                                                                                                                                                   4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGAAGTAATTGAAGGGAAACGCGTCCTT 4560
                                                                                                                                                                                                                                                                                                                                                                                                                                                              4561 GAAAAAGTAAAAGATTTATCTGATGAAGAAAGAAACATTAGCTAAACTTGGTGTAAGT 4620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4621 GCTGTACGTTTTGTTGAGCCAAATAATACAATTACAGTCAATACACAAAATGAATTTACA 4680
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 4740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4741 GGCGCACGAGTATGTACCAATGTTGCTGACGATGGACAGCCGTAGTAGTAATTGACAAG 4800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTATTTACTGTGTGGGTTAAA 4860
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  5301 GITCAGTACGGGCTTTACCCATCTTGTAAAATTACGGAGAATACAATAAAGTATTTT 5360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
TITLE OF INVENTION: of No. 6218141-Typeable Haemophilus
NUMBER OF SEQUENCES: 10
CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Sequence 6, Application US/08719641 Patent No. 6218141
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        4921 AACAGGTTATTATTATG 4937
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               5361 AACAGGTTATTATTATG 5377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                COMPUTER READABLE FORM:
MEDIUM TYPE: Floppy disk
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      CITY: Arlington
STATE: Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ADDRESSEE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                COUNTRY:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         US-08-719-641-6
ò
                                                                                                            g
                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                       δλ
                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                  ò
                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                       q
                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
```

```
121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTTCATCTTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     241 CACATGAAATGAACCGAGGGAAGGGAGGGAGGGGCAAGAATGAAGAGGGAGCTGAAC 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               301 GAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAATATGAACAAG 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              361 ATATATCGTCTCAAATTCAGCAAACGCCTGAATGCTTTGGTTGCTGTGTCTGAATTGGCA 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 421 CGGGGTTGTGACCATTCCACAGAAAAGGCTTCCGCTATGTTACTATCTTTAGGTGTAAC 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          481 CACTTAGCGTTAAAGCCACTTTCCGCTATGTTACTATCTTTAGGTGTAACATCTATTCCA 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      541 CAATCTGTTTTAGCAAGCGGCTTACAAGGAATGGATGTAGTACACGGCACAGCCACTATG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   h 97.6%; Score 4820.2; DB 4; Length 9323; Similarity 98.5%; Pred. No. 0; Conservative 0; Mismatches 73; Indels 0;
                   OPERATING SYSTEM: PC-DOS/MS-DOS
SOFTWARE: PATENTIN Release #1.0, Version #1.30
CURRENT APPLICATION DATA:
                                                                                                                                                                                                            APPLICATION NUMBER: US PCT/US93/02166
FILING DATE: 16-MAR-1993
                                                                                                                                                                                                                                                                                                                                                            REFERENCE/DOCKET NUMBER: 1038-625
TELECOMMUNICATION INFORMATION:
TELEPHONE: (703) 415-0810
TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 6:
                                                                                                                                                    JMBER: US 08/302,832
16-SEP-1994
                                                                      APPLICATION NUMBER: US/08/719,641
                                                                                                                                                                                                                                                                 GB 9205704.1
                                                                                                                                                                                                                                                                                                                              NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
IBM PC compatible
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         , MOLECULE TYPE: DNA (genomic) US-08-719-641-6
                                                                                                                                                                                                                                                                                     FILING DATE: 16-MAR-1992
ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    9323 base pairs
                                                                                                                                                                                                                                                                                                                                                                                                                                                             SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Matches 4864; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   nucleic acid
EDNESS: single
                                                                                                                                                                                    PRIOR APPLICATION DATA:
                                                                                                             CLASSIFICATION: 530
PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                PRIOR APPLICATION DATA:
                                                                                                                                                      APPLICATION NUMBER:
                                                                                                                                                                                                                                                                    APPLICATION NUMBER:
                 OPERATING SYSTEM:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            linear
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         STRANDEDNESS:
                                                                                                                                                                         FILING DATE:
                                                                                              FILING DATE
COMPUTER:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            TOPOLOGY:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      LENGTH:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Query Match
Best Local
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
```

ö

À

1040		720 1160	80	840 1280	900 1340	960 1400	1020 1460	1080 1520	1140 1580	1200 1640	1260 1700	1320 1760	1380 1820	1440 1880	1500 1940	1560 2000	1620 2060	1680
	ASGAAAACAAGTAATAAAACCATTATCGCAACAGTGTTGACGTATCATTAATTGGAAA	CAATTTAACATCGACCAAAATGAAATGGTGCAGTTTTTACAAGAAAAAAAA	. GTATTCAACCGTGTTACATCTAACCAAATCTCCCAATTAAAAGGGATTTAGATTCTTAGAT 	GGACAAGTCTTTTAATCAACCCAAATGGTATCACAATAGGTAAAGACGCAATTATTAAC :	ACTAATGGCTTTACGGCTTCTACGCTAGACATTTCTAACGAAAACATCAAGGCGCGTAATACTAATGGCTTTACGGCTTCTACGAAAACATCAAGGCGCGTAATACTAACGAAAACATCAAGGCGCGTAAT	TICACCTICGAGCAAACCAAAGATAAAGCGCTCGCTGAAATTGTGAATCACGGTTTAATT 	ACTGTCGGTAAAGACGGCAGTGTAAATCTTATTGGTGGCAAAGTGAAAAACGAGGGTGTG 	ATTAGCGTAAATGGTGGCAGCATTTCTTTACTCGCAGGCAAAAAATCACCCATCAGCGAT 	ATAATAAACCCAACCATTACTTACAGCATTGCCGCGCGCG	GGCGATATTTTGCCAAAGGCGGTAACATTAATGTCCGTGCTGCTGCTGCTATTCGAAACCAA. 	GGTAAACTTTCTGCTGATTCTGTAAGCAAAGATAAAAGGGGCAATATTGTTCTTTCCGCC 	AAAGAGGGGAAATTGGGGGGTGTAATTTCCGCTCAAAATCAGCAAGCTAAAGGC 	GGCAAGCTGATGATTACAGGCGATAAAGTCACATTAAAAACAGGTGCAGTTATCGACCTT 	TCAGGTAAAGAAGGGGAGAAACTTACCTTGGCGGTGACGAGCGCGGGAAGGTAAAAAC 	GGCATTCAATTAGCAAAGAAAACCTCTTTAGAAAAAGGCTCAACCATCAATGTATCAGGC 	AAAGAAAAAGGCGGACGCTATTGTGTGGGGCGATATTGCGTTAATTGACGGCAATATT 	AACGCTCAAGGTAGTGGTGATATCGCTAAAACCGGTGGTTTTGTGGGGGATCGGGGCAT 	TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT
981	1041	661	721	781	841 1281	901	961	1021	1081	1141	1201	1261	1321 1761	1381	1441	1501	1561	1621
q o	P q	Oy Dp	Qy	Qy	Qy Db	Qy	Qy	Qy	Qy	Qy	QY Db	Qy Db	Qy Db	Qy Db	QY	Qy	Oy Dp	QY

2120 1740 2180 1800 2240	1 2 2 2	1980 2420 2040 2480	2100 2540 2160 2600	2220 2660 2280 2280	34 78 40 84	4 6 6 6	58 02 64 08	2700 3140 2760 3200
1 TATTTATCCATTGACAGCAATGCAATTGTTAAAACAAAAGAGTGGTTGCTAGACCCTGAT 1 GATGTAACAATTGAAGCCGAAGACCCCTTCGCAATAATACCGGTATAAATGATGATGAATTC 1 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	1 ACCAATACAACTTATCAAATTATCTGAAAAACGCCTGGACAATGAATATAACGGCATCA	AGTAAAGGTCAGCGTGGCGGAGCGTTCAGATTGATGGAGATAT		GATTTCAGGGCTAACAACGTATCTTTAAACGGAACGGGTAAAGGTCTGAATATCA 	ATTAACCAAACTACGAGAAGAACACCTCGTATTGGCAAACCAGCCTGATTCGCACTG   ATTAACCAAACTACGAGAAGAACACCTCGTATTGGCAAACCAGCCATGATTCGCACTG   ATTAACCAAACTACGAGAAAACACCTCGTATTGGCAAACCAGCCATGATTCGCATGATTCGCAACCTGCTTATTAAATCATGAAACAGCGCGCAAATTTAACTTTAATTAA	AGCAATAGCAAAGGCTTAACAACACAGT	CCAAACGAGAACATGA 	GAGTTAAAAATGAGTGAAATTAATATCTCTAACGGCGCTAATTTTAC 
2061 1681 2121 1741 2181	1801 2241 1861 2301	92 36 98 42	04 48 10	16.	34 34 78	40 84 46 90	52 96 58 02	
Db Qy Db Qy	QY Db QY Db	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Oy Oy Ob	oy da	oy oy	Oy Oy Ob	Oy Oy Db	Oy Oy Dp

Qy Dp	2761 3201	AATTTCAGCCTCAGACAGCAGAAGATGATTTTTATGACGGGTACGCAGCAATGCCATC	2820
O <sub>Y</sub>	2821	FGGACAAAGTC	32.3
Qy Db	3321	hatattactatcgagaagcagcaaatgttacgctagaacc 	38.
Qy Db	3381	GCCCCTAATCAGCAAACATAAGGGATAGAGTTATAAAACTTGGCAG 	00
Qy Db	3001	CAATCTCACTAT	90
Qy	3061	TCAGAAAGCGCCACTTTTAAAGGAAAGACTAGAGATACCCTAAATATCACCGGCAATTTT 	3120
Qy	3121	ACCAATAATGGCACTGCCGAAATTAATATAACACAAGGAGTGGTAAAACTTGGCAATGTT 	3180
Qy Db	3181	CACGCTAAACGCAA 	3240
Z G	3241	TCAACAAAAAGGAAGCTTAAATATTACAGACAGTAATAATGATGC 	30
Oy Db	3301	GAAATCCAAATTGGCGGCAATATCTCGCAAAAAGAAGGCAACCTCACGATTTCTTCCGAT	3360
Qy	3361 3801	AAAATTAATATCACCAAACAGATAACAATCAAAAAGGTATTGATGGAGAGGACTCTAGT 	3420
Qy Db	3421	ractattaaaccaaagaat 	3480 3920
Qy Db	3481	AGATGGTAGAGATTTA 	3540
Qy	3541 3981	NACAGTAATGACGGTAACAGCGGTGCCGAAGCCGAAAACAGTAACTTTTAAC 	3600
Qy Db	3601	ACACTAAATAGCAAAGTG	3660
Qy Dp	3661	GCTTAACT             GCTTAACT	3720
2y Ob	3721 4161	CTTCTCTCAAACAGTAAATATC	3780 4220
Sy Op	3781		4 8

T 3900 T 4340	T 3960   T 4400	A 4020   A 4460	A 4080     A 4520	C 4140   C 4580	c 4200   c 4640	G 4260   G 4700	r 4320   r 4760	G 4380   G 4820	A 4440     4880	3 4500     4940	r 4560 l r 5000	r 4620     5060	4680 1 4 5120	r 4740   F 5180	3 4800 5 5240	4 4860 A 5300	4920	
3841 GCAAGTATTACAACCAAAACAGGTGATATCAGGGGTACGATTTCCGGTAACACGGTAAG 	3901 GTTAGCGCGACTGGTGATTTAACCACTAAATCCGGCTCAAAAATTGAAGCGAAATCGGG 	3961 GAGGCTAATGTAACAAGTGCAACAGGTACAATTGGCGGTACAATTTCGGGTAATACGGT/ 	4021 AATGTTACGGCAAACGCTGGCGATTTAACAGTTGGGAATGGCGCAGAAATTAATGCGAC,	4081 GAAGGAGCTGCAACCTTAACGCCAACAGGGAATACCTTGACTACTGAAGCCGGTTCTAGG 	4141 ATCACTTCAACTAAGGGTCAGGTAGACCTCTTGGCTCAGAATGGTAGCATCGCAGGAAGG 	4201 ATTAATGCTGCTAATGTGACATTAAATACTACAGGCACCTTAACCACGGGGGGGCGCGGGGCTCC	4261 GATATTAAAGCAACCAGGGCACCTTGGTTATTAACGCAAAAGTGCTAAGGTAATGGT 	4321 GATGCATCAGGTGATAGTACAGAAGTGAATGCAGTCAAGCGCAAGGGGCTCTGGTAGTGTC 	4381 ACTGCGGCAACCTCAAGCAGTGTGAATATCACTGGGGATTTAAACACAGTAAATGGGTTR 	4441 AATATCATTTCGAAAGATGGTAGAAACACTGTGCGCTTAAGAGGCAAGGAAATTGAGGTC 	4501 AAATATATCCAGCCAGGTGTAGCAAGTGTAGAAGTAATTGAAGGGGAAGGGGTCCTT 	4561 GAAAAAGTAAAACATTTATCTGATCAACAACAGAAACATTAGCTAAACTTGGTGTAAGT 		4681 ACCAGACCGTCAAGTCAAGTGATAATTTCTGAAGGTAAGGCGTGTTTCTCAAGTGGTAAT 474 	4741 GECGCACGAGTATGTACCAATGTTGCTCACGATGGACACCCGTAGTCAGTAATTGACAAG 	4801 GTAGATTTCATCCTGCAATGAAGTCATTTTATTTTCGTATTAVTTACTGTGTGGGTTAAA 	4861 GTTCAGTACGGGCTTTACCCATCTTGTAAAAATTACGGAGAATACAATAAAGTATTTTT 	4921 AACAGGTTATTATG 4937
Oy Dp	Qy Dp	Qy Dp	Qy Db	Qy Db	Qy Db	Qy Db	Qy	Oy Db	Qy	Qy	Qy	Qy Db	Qy Dp	Qy Dp	Qy Dp	Qy Dp	Qy	Qy

Db 5361 AACAGGTTATTATTATG 5377

Search completed: March 22, 2003, 05:46:10 Job time : 258 secs

4, -.

```
March 21, 2003, 20:50:22 ; Search time 6338 Seconds
   (without alignments)
   12615.512 Million cell updates/sec
                                                                                                                                                                                                1 taaatatacaagataataaa......tttaacaggttattattatg 4937
                                                                                                                                                                                                                                                                                                                  32308132
GenCore version 5.1.4\_p5\_4578 Copyright (c) 1993 - 2003 Compugen Ltd.
                                                                                                                                                                                                                                                                                                            Total number of hits satisfying chosen parameters:
                                                                                                                                                                                                                                                                                16154066 seqs, 8097743376 residues
                                                                                                                                                                                                                                                                                                                                                                                            Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries
                                                                OM nucleic - nucleic search, using sw model
                                                                                                                                                                                                                          Scoring table: IDENTITY_NUC Gapext 1.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              em_gss_other:*
em_gss_pro:*
em_gss_rod:*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   em_gss_vrt:*
em_gss_fun:*
em_gss_mam:*
                                                                                                                                                                                                                                                                                                                                                Minimum DB seq length: 0
Maximum DB seq length: 200000000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 gb_est3:*
gb_est4:*
gb_est5:*
em_estfun:*
em_estfun:*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                em_gss_hum:*
em_gss_inv:*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  em_gss_pln:*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   em_gss_mus:*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              em_estba:*
em_esthum:*
em_estin:*
                                                                                                                                                               US-10-092-880-3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             em_estou:
em_estol:
em_estro:
em_estro:
em_btc:*
gb_est1:*
gb_est2:*
gb_htc:*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 :ssb_dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                               EST:*
                                                                                                                                                                               Perfect score:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Database :
                                                                                                                                                                                                                                                                                 Searched:
                                                                                                                                                                                                Sequence:
                                                                                                 Run on:
```

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

		٥			SUMMARIES		
1		ø (					
No.			uery Match Length DB ID	DB	ID	Description	
c 1	78.2	i	:	17	BH000184	BH000184 2M0287B22	
c 5	9.92			17	AZ545997	AZ545997 ENTEB41TR	
3	76.2			17	A2654231	AZ654231 1M0528K13	
4	74.6	1.5	985	17	CNS06NAS	AL406538 T3 end of	
c 2	71.2			17	AZ605403	AZ605403 1M0426P11	
4	707			17	A7967029	21T.75COMC 9C073P44	

AK018644 Mus muscu AL078714 Drosophil	BH834109 BACPP6-K0		AL107965 Drosophil	BUA79A03 BOCT7777ED	A12/2000 50#0/#EE					AL052980 Drosophil		AL061936 Drosophil		AL063921 Drosophil	etraodo	BM274994 PfESToaa7	B12981 T24D11-Sp6	AL097298 Drosophil	AQ922590 RPCI-23-2	AL105023 Drosophil	AZ532642 ENTBP49TR	AL054949 Drosophil			AL065999 Drosophil	HWM002.B		AL075432 Drosophil	AL306807 Tetraodon	AW906883 EST343006	408	AL546530 AL546530	BI920072 EST539995	AL097133 Drosophil	BM468018 AGENCOURT	AL188548 Tetraodon	AL065764 Drosophil
AK018644 CNS00LT2	ВН834109	AV/58661	CNS017F7	A2349606	DH4 / 04 U3	CNSU/AZY	AQ347002	CNS00599	CNSOOEVL	CNS0090S	AZ676519	CNS0021J	CNS04AEE	CNS0039G	CNS030F0	BM274994	B12981	CNS00Z6W	AQ922590	CNS0155H	AZ532642	CNS00A5G	BQ876453	CNSOODSU	CNS006W4	BE420745	BH094146	CNSOOILL	CNS04TQ6	AW906883	BG860408	AL546530	BI920072	CNS00Z2B	BM468018	CNS02AH7	CNS006MS
11	17	0 !	17	17	17	\ T	17	17	17	17	17	17	17	17	17	13	17	17	17	17	17	17	14	17	17	10	17	17	17	10				7	13	17	11
1588	490	821	1101	040	7/0	1063	342	1036	1101	854	951	1101	806	1101	437	265	1223	388	613	1001	855	944	1055	1101	889	1885	420	974	1101	525	570	604	649	1059	1300	417	866
4.1	4.4	1.4	4.	† · ·	<del>*</del> •	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2
70.4		٠.		, o r	٠,	٠,	99	9	•					•			•	•			63	o	ď.	ζ.	62.6	ď	62	62					61.8				
r ∞	, on 9	0 TO	11			C 14			17			c 20							c 27		29	c 30	31	32	c 33	34		c 36		38	39	0 40		c 42	43	44	45

## ALIGNMENTS

RESULT 1 BH000184/c	
rocus	BH000184 578 bp DNA linear GSS 27-APR-2001
DEFINITION	2M0287B22R Mouse 10kb plasmid UUGC2M library Mus musculus genomic
	clone UUGC2M0287B22 R, DNA sequence.
ACCESSION	BH000184
VERSION	BH000184.1 GI:13871410
KEYWORDS	GSS.
SOURCE	house mouse.
ORGANISM	Mus musculus
	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
	Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE	1 (bases 1 to 578)
AUTHORS	<pre>Dunn,D., Aoyagi,A., Barber,M., Beacorn,T., Duval,B., Hamil,C.,</pre>
	Islam, H., Longacre, S., Mahmoud, M., Meenen, E., Pedersen, T., Reilly
	,M., Rose,M., Rose,R., Stokes,R., Tingey,A., von Niederhausern,A.
	and Wright, D., Weiss, R.
TITLE	Mouse whole genome scaffolding with paired end reads from 10kb
	plasmid inserts
JOURNAL	Unpublished (2000)
COMMENT	Contact: Robert B. Weiss
	University of Utah Genome Center
	University of Utah
	Rm. 308, Biomedical Polymers Research Bldg., 20 S., 2030 E., SLC, UT
	84112, USA
	Tel: 801 585 5606
	Fax: 801 585 7177
	Email: ddunn@genetics.utah.edu
	Insert Length: 10000 Std Error: 0.00

.\_

```
Fax: 301 838 3543
                                                                                                                                 Class: shotgun
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         plasmid inserts
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Mus musculus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Best Local Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              house mouse.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                USA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      AZ654231
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Query Match
                                                                                                                                                                                                                                source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Matches
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  RESULT 3
A2654231
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     AUTHORS
                                                                                                                                                                                                      FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        COMMENT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ORIGIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       q
                                                                                                                                                                                                                                                                                 /Jab_host="E. coli strain XL10-Gold, T1-resistant, F-"
/note="Vector: PWW42nv; Purified genomic DNA from M.
musculus C57BL/6J (female) was obtained from the Jackson
Laboratory Mouse DNA Resource
(http://www.jax.org/resources/documents/dares/). The DNA
was hydrodynamically sheared by repeated passage through a
0.005 inch or liftee at constant velocity. The sheared DNA
was blunt endripaired with T4 DNA polymerase and T4
polynucleotide kinase. Adaptor oligonucleotides were
ligated to the blunt ends in high molar excess. The
adaptored DNA was purified and sie-relected for a 9.5 to
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    10.5 Kb range using preparative agazose gel electrophoresis. Vector DNA was prepared from a derivative of pWD42 (gil4732114|gb/RF129072.1), a copy-number inducible derivative of plasmid R1. The vector was ligated with adaptors complementary to the insert adaptors and purified. The sheared, adaptored mouse DNA was annealed to adaptored vector DNA, and transformed into chemically competent E. coll XL10-Gold (Stratagene) cells and selected for ampicillin resistance."
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               GSS 14-NOV-2000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          AZ545997 688 bp DNA linear GSS 14-NOV-200
ENTEB41TR Entamoeba histolytica Sheared DNA Entamoeba histolytica
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Eukaryota; Entamoebidae; Entamoeba.

(Lobases 1 to 688).

Loftus, B., Van Aken, S. and Fraser, C.

Determination of clone end sequences from Entamoeba histolytica

HM1:IMSS sheared DNA library
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    102 GTATAAATCCGCCATATAAAATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCT 161
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       162 ITCAICITICAICITICAICITICAICITICAICITICAICITICAICITICAICITICAICITICA 221
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   0; Gaps
                                                                                                                                                                                          /db_xref="texon:10090"
/clone="UUGC2M0287B22"
/clone_lib="Mouse 10kb plasmid UUGC2M library"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1.6%; Score 78.2; DB 17; Length 578; 74.8%; Pred. No. 5.6e-07; Live 0; Mismatches 33; Indels 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 33; Indels
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Orbitact: Brendan J Loftus
Department of Eukaryotic Genomics
The Institute for Genomic Research
9712 Medical Center Dr., Rockville, MD 20850, USA
Tel: 301 838 0208
Plate: 0287 row: B column: 22
Seg primer: CACACAGGAAACAGCTATGACC
                                                                                                                                                /organism="Mus musculus"
                                                                        High quality sequence stop: 578.
Location/Qualifiers
                                                                                                                                                                          /strain="C57BL/6J
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       AZ545997.1 GI:11167106
                                                                                                                                                                                                                                                                       /sex="Female"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   genomic, DNA sequence.
AZ545997
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Entamoeba histolytica.
Entamoeba histolytica
                                                 Class: plasmid ends
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Local Similarity 74.8
nes 98; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Unpublished (2000)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         222 TCTTTCATCTT 232
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 104 TCTTTCTTCTT 94
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             241 a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Query Match
                                                                                                                         source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  AZ545997/c
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Matches
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        JOURNAL
                                                                                               FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              RESULT 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ORIGIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        SOURCE
```

ò qq

qq õ g

```
Colone_lib="Edaturing of the property of the p
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         linear GSS 14-DEC-2000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Rm. 308, Biomedical Polymers Research Bldg., 20 S. 2030 E., SLC, UT
Email: bjloftus@tigr.org
Clones are derived from the Entamoeba histolytica HM1:IMSS sheared
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
1 (bases 1 to 403)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   whole genome shotgun sequencing projects. In Genome Sequencing: A Practical Approach, eds. M. Vaudin and B. Barell, Oxford University Press, 1999)."
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             A2654231
1M0528K13F Mouse 10kb plasmid UUGC1M library Mus musculus genomic clone UUGC1M0528K13 F, DNA sequence.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Dunn, D., Aoyagi, A., Barber, M., Beacorn, T., Duval, B., Hamil, C., Islam, H., Longacre, S., Mahmoud, M., Meenen, E., Pedersen, T., Reilly, M., Rose, M., Rose, M., Stokes, R., Tingey, A., von Niederhausern, A. and Wright, D., Weiss, R.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    24; Indels 0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          128 TAATCTITCATCTITCATCTITAATCTITCATCTITCATCTITCATCTITCATCTITCAT 187
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Mouse whole genome scaffolding with paired end reads from 10kb
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     188 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCA 242
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1.6%; Score 76.6; DB 17; Length 688; 79.1%; Pred. No. 1.3e-06; ve 0; Mismatches 24; Indels 0.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /organism="Entamoeba histolytica"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Std Error: 0.00
                                                                                                                                                                                                                                                               High quality sequence start: 15
High quality sequence stop: 280.
Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         University of Utah Genome Center
University of Utah
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Email: ddunn@genetics.utah.edu
Insert Length: 10000 Std Error
Plate: 0528 row: K column: 13
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /db_xref="taxon:5759"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               134 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /strain="HM1:IMSS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Unpublished (2000)
Contact: Robert B. Weiss
                                                                                                               DNA library
Seq primer: M13-Reverse
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           AZ654231.1 GI:11791377
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            79.18;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              91; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Tel: 801 585 5606
Fax: 801 585 7177
                                                                                                                                                                                                                                                                                                                                                                                                                                      .688
```

```
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
Gaillardin, C. and Casaregola, S. Genomic exploration of the hemiascomycetous yeasts: 9.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /organism="Saccharomyces kluyveri"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /evidence=not_experimental complement(<857. .>985)
                                             Saccharomyces kluyveri
FEBS Lett. 487 (1), 56-60 (2000)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /db_xref="taxon:4934"
/clone="AU0AA010G07"
/clone_lib="AU0AA"
/note="end : T3"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    the other extremity of this i
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                /strain="CBS 3082
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           AZ605403.1 GI:11727593
                                                                                                                                            (bases 1 to 985)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      92; Conservative
                                                                                                                                                                         Submitted (07-577 2 rms
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Mus musculus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    house mouse.
                                                                                                                                                                      Genoscope
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 misc_feature
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   misc_feature
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        246 G 246
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      677 G 677
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Best Local
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     AZ605403/c
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Matches
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 RESULT 5
                                                                                                                                                                            AUTHORS
                                                                                                                                                                                                                             JOURNAL
                                                                                                 MEDLINE
                                                                                                                              PUBMED
                                                                                                                                                  REFERENCE
                                                                          JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      FEATURES
                                                                                                                                                                                                                                                                                                  COMMENT
                         TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                 (http://www.jax.org/resources/documents/dnares/). The DNA was hydrodynamically sheared by repeated passage through a 0.005 inch orifice at constant velocity. The sheared DNA was blunt end-repaired with T4 DNA polymerase and T4 polymucleotide Kinase. Adaptor oligonicleotides were ligated to the blunt ends in high molar excess. The adaptored DNA was purified and size-selected for a 9.5 to 10.5 kb range using preparative agarcos eg from a derivative of pwNa2 (gillylah194)7211, a copy-number inducible derivative of ppNa2)72.1, a copy-number inducible derivative of plasmid R1. The vector was ligated with adaptors complementary to the insert adaptors and purified. The sheared, adaptored mouse DNA was annealed to adaptored vector DNA, and transformed into chemically-competent E. coli XLLO-Gold (Stratagone) cells and selected for ampicillin resistance."
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GSS 17-JUN-2001
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          CNSOGNAS 985 bp DNA linear GSS 17-JUN-200 T3 end of clone AUOAA010G07 of library AUOAA from strain CBS 3082 of Saccharomyces kluyveri, genomic survey sequence.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Souciet, J. L., Aigle, M., Artiguenave, F., Blandin, G.,
Bolotin-Fukuhara, M., Bon, E., Brottier, P., Casaregola, S.,
Bolotin-Fukuhara, M., Bon, E., Brottier, P., Casaregola, S.,
Be-Montigny, J., Dujon, B., Durrens, P., Lepingle, A., Llorente, B.,
Malpertuy, A., Neuveglise, C., Ozier-Kalogeropoulos, O., Potier, S.,
Saurin, W., Tekala, F., Toffano-Nioche, C., Wesolowski-Louvel, M.,
Wincker, P. and Weissenbach, J.
Wincker, P. and Weissenbach, J.
Weenomic exploration of the hemiascomycetous yeasts: 1. A set of
yeast species for molecular evolution studies
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Saccharomyces kluyveri.
Saccharomyces Kluyveri
Bukaryota; Fungi; Ascomycota; Saccharomycotina: Saccharomycetes;
Saccharomycetales; Saccharomycetaceae; Saccharomyces.
                                                                                                                                                                                                                                                                                            /note="Vector: PWD42nv; Purified genomic DNA from M. musculus C57BL/6J (male) was obtained from the Jackson Laboratory Mouse DNA Resource
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 2 (bases 1 to 985)
Neuveglise,C., Bon,E., Lepingle,A., Wincker,P., Artiguenave,F.,
                                                                                                                                                                                                                                                                           /lab_host="E. Coli strain XL10-Gold, Tl-resistant, F-"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     134 TICATCITICALCITIAATCITICATCITICATCITICATCITICATCITICATCITICATCITICA 193
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      194 TCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTTCACATG 246
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /db_xref="taxon:10090"
/db_xref="taxon:10090"
/clone_ilb="mouse 10kb plasmid UUGCIM library"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1.5%; Score 76.2; DB 17; Length 403; 79.6%; Pred. No. 1.5e-06; tive 0; Mismatches 23; Indels 0;
Seg primer: CGTTGTAAAACGACGGCCAGT
                                                                                                                                 /organism="Mus musculus"
                                                      High quality sequence stop: 403.
Location/Qualifiers
                                                                                                                                                     /strain="C57BL/6J
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  AL406538.1 GI:12170669
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (bases 1 to 985)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    11152876
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Juer,
Best Local Simu
Ent Pocal Simu
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            JOURNAL
MEDLINE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PUBMED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     RESULT 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              TITLE
                                                                                         FEATURES
```

```
GSS 13-DEC-2000
Submitted (07-58P-2000) Genoscope - Centre National de Sequencage, 2 rue Gaston Cremieux, CP 5706, 91057 EVRY cedex, FRANCE. (E-mail: sequefogenoscope.cns.fr - Web: www.qenoscope.cns.fr)

Sequefogenoscope.cns.fr - Web: www.qenoscope.cns.fr)

This GSS is part of a random genomic sequencing program of thirteen yeast species: Saccharomyces bayanus var. uvarum, Saccharomyces servazzii, Zygosaccharomyces rouxii, Saccharomyces kluyveromyces thermotolerans, Kluyveromyces lactis var. lactis, Kluyveromyces thermotolerans, Kluyveromyces angusta, Debaryomyces hancenii var. hansenii, Pichia sorbitophila, Candida tropicalis and Yarrowia lipolytica. Genomic inserts of 3 to 5 keywords for description of this sequence and for the sequence of the other extremity of this insert.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ó
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Complement(~6877...>985)

Anote="similar to Saccharomyces cerevisiae ORF YOL056w [
CPM3.: phosphoglycerate mutase ]"

Avidence=not_experimental
Complement(~860...>985)

Anote="similar to Saccharomyces cerevisiae ORF YDL021w [
CPM2.: phosphoglycerate mutase ]"

Avidence=not_experimental
a 233 c 204 g 310 t 19 others;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    AZ605403 625 bp DNA linear GSS 13-DEC-20G 1M0426P11R Mouse 10kb plasmid UUGCIM library Mus musculus genomic clone UUGC1M0426P11 R, DNA sequence.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /note="similar to Saccharomyces cerevisiae ORF YDL020c [ RPN4 ; 26S proteasome subunit ]"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          126 TATAATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTC 185
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1.5%; Score 74.6; DB 17; Length 985; 76.0%; Pred. No. 4e-06; Live 0; Mismatches 29; Indels 0;
```

```
Laboratory Mouse DNA Resource (http://www.jax.org/resources/documents/dnares/). The DNA was hydrodynamically sheared by repeated passage through a 0.005 inch orifice at constant velocity. The sheared DNA was blunt end-repaired with T4 DNA polymerase and T4 polynuclectical kinase. Adaptor oligonuclectides were ligated to the blunt ends in high molar excess. The adaptored DNA was purfitled and size-selected for a 9.5 to 10.5 kb range using preparative agarose gel. electrophoresis. Vector DNA was prepared from a derivative of pubble (gil4732114|gb|AF129072.1), a copy-number inducible derivative of plasmid R1. The vector was ligated with adaptors complementary to the insert adaptors and purified. The sheared, adaptored mouse DNA was annealed to chemically competent E. coli XLIO-Gold (Stratagene) cells and selected for ampicillin resistance."
                                                                                                                                                                                                                                                                                                                   308, Blomedical Polymers Research Bldg., 20 S. 2030 E., SLC, UT
Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
                       1 (bases 1 to 625)
Dunn, D., Aoyagi, A., Barber, M., Beacorn, T., Duval, B., Hamil, C.,
Islam, H., Longacre, S., Mahmoud, M., Meenen, E., Pedersen, T., Reilly
M., Rose, M., Rose, R., Stokes, R., Tingey, A., von Niederhausern, A.
and Wright, D., Weiss, R.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                GSS 27-APR-2001
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /note-"vector: PWD42nv; Purified genomic DNA from M. musculus C57BL/6J (male) was obtained from the Jackson
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               A2967029
2M0237J15R Mouse 10kb plasmid UUGC2M library Mus musculus genomic clone UUGC2M0237J15 R, DNA sequence.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /lab_host="E. Coli strain XL10-Gold, T1-resistant, F-"
                                                                                                                                                            Mouse whole genome scaffolding with paired end reads from 10kb
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   126 TATAATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTC 185
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                186 ATCTITCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTC 241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /clone_lib="Mouse 10kb plasmid UUGC1M library"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1.4%; Score 71.2; DB 17; Length 625; 75.9%; Pred. No. 2.2e-05; tive 0; Mismatches 28; Indels 0;
                                                                                                                                                                                                                                                                                                                                                                                                                              Email: ddunn@genetics.utah.edu
Insert Length: 10000 Std Error: 0.00
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Plate: 0426 row: P column: 11
Seg primer: CACACAGGAAACAGCTATGACC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /organism="Mus musculus"
                                                                                                                                                                                                                                     Contact: Robert B, Weiss
University of Utah Genome Center
University of Utah
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 High quality sequence stop: 625.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /db_xref="taxon:10090"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /clone="UUGC1M0426P11"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /strain="C57BL/6J
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  /sex="Male"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Class: plasmid ends
                                                                                                                                                                                                                      Unpublished (2000)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Best Local Similarity 75.9%
Matches 88; Conservative
                                                                                                                                                                                                                                                                                                                                                                          Tel: 801 585 5606
Fax: 801 585 7177
                                                                                                                                                                                      plasmid inserts
                                                                                                                                                                                                                                                                                                                                                      USA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                AZ967029
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               BASE COUNT
                             REFERENCE
                                                          AUTHORS
                                                                                                                                                                                                                JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              RESULT 6
AZ967029
                                                                                                                                                            TITLE
                                                                                                                                                                                                                                        COMMENT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
```

AZ967029.1 GI:13838256

VERSION

```
(http://www.jax.org/resources/documents/dnares/). The DNA was hydrodynamically sheared by repeated passage through a 0.005 inch orifice at constant velocity. The sheared DNA was blunt end-repaired with T4 DNA polymerase and T4 polymucleotide kinase. Adaptor ollgonucleotides were ligated to the blunt ends in high molar excess. The adaptored DNA was purified and size-selected for a 9.5 to 10.5 kb range using preparative agarose gel clectrophoresis. Vector DNA was prepared from a derivative of pWD42 (gil47321141gb AR129072.1), a copy-number with adaptors complementary to the insert adaptors and purified. The sheared, adaptored mouse DNA was annealed to adaptored vector DNA, and transformed into
                                                                                                                                                                                                                                                                                                          Unpublished (2000)
Contact: Robert B. Weiss
University of Utah Genome Center
University of Utah
Rm. 308, Biomedical Polymers Research Bldg., 20 S. 2030 E., SLC, UT
                                                Mus musculus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
1 (bases 1 to 726)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Dunn,D., Aoyagi,A., Barber,M., Beacorn,T., Duval,B., Hamil,C., Islam,H., Longacre,S., Mahmoud,M., Meenen,E., Pedersen,T., Reilly,M., Rose,M., Rose,R., Stokes,R., Tingey,A., von Niederhausern,A. and Wright,D., Weiss,R.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   chemically-competent E. coli XL10-Gold (Stratagene) cells and selected for ampicillin resistance." 164\ c 81\ g 306\ t
                                                                                                                                                                                                                                                               Mouse whole genome scaffolding with paired end reads from 10kb
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         55 TTACAACACCTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCGGCC 114
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          396 TGAGAAAICCCTIGGIGTGTTCAAGTTTACAATAGTTTAAATATTCATCCTTTCTCCTTT 455
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 115 ATATAAAATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATC 174
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               175 TITCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTC 234
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /clone="UUGC2M0237J15"
/clone_lib="Mouse 10kb plasmid UUGC2M library"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1.4%; Score 70.4; DB 17; Length 726;
60.4%; Pred. No. 3.4e-05;
tive 0; Mismatches 76; Indels 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Email: ddunn@genetics.utah.edu
Insert Length: 10000 Std Error: 0.00
Plate: 0237 row: J column: 15
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Plate: 0237 row: J column: 15
Seq primer: CACACAGGAAACAGCTATGACC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /organism="Mus musculus"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             High quality sequence stop: 726.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            /db_xref="taxon:10090"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /strain="C57BL/6J
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Class: plasmid ends
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Tel: 801 585 5606
Fax: 801 585 7177
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Best Local Similarity 60.49
Matches 116; Conservative
                                                                                                                                                                                                                                                                                      plasmid inserts
                               house mouse.
                                                                                                                                                                                                                                                                                                                                                                                                                                                    USA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          175 a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Source
                                                   ORGANISM
                                                                                                                              REFERENCE
                                                                                                                                                                                                                                                                                                                JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          BASE COUNT
KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    FEATURES
                                                                                                                                                                                                                                                            TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ORIGIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   q
```

us-10-092-880-3.rst

δŏ q

```
Arakawa, T., Baldarelli, R., Bono, H., Brownstein, M., Bult, C., Carninci, P., Fukuda, S., Fukunishi, Y., Furuno, M., Hangaki, T., Hara, Hayaki, T., Hara, H
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               linear GSS 14-JUN-1999
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /tissue_type="cecum"
/clone_lib="RIKEN full-length enriched mouse cDNA library"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              126 TATAATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTTC 185
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1.4%; Score 70.4; DB 11; Length 1588; 74.2%; Pred. No. 3.8e-05; Live 0; Mismatches 31; Indels 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /strain="c57BL/6""
/db_xref="FaNTOW_DB:9130022E09"
/db_xref="MGD:MGI:1997754"
/db_xref="taxon:10090"
/clone="9130022E09"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              DNA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            unclassifiable transcript"
/db_xref="MGD:MGI:1921814"
358 c 242 g 608
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /organism="Mus musculus"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1101 bp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /note="evidence:NAS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /dev_stage="adult"
1. .1588
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  /sex="male"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Local Similarity 74.29 les 89; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         .1588
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              CNS00LT2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   CNS00LT2/c
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Matches
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RESULT 8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        COMMENT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Kawaij, Shinagawa, A., Shibata, K., Yoshino, M., Itoh, M., Ishii, Y., Arakawa, T., Hara, A., Fukunishi, Y., Konno, H., Adachi, J., Ehkuda, S., Arakawa, T., Itara, A., Fukunishi, Y., Kondo, S., Yamanaka, I., Saito, T., Saito, T., Gojobori, T., Bono, H., Kondo, S., Yamanaka, I., Saito, T., Gasawa, T., Saito, H., Saito, T., Saito, T., Saito, T., Saito, T., Saito, T., Sabula, T., Gasarant, T., Ruehl, P., Lewis, S., Matsuo, Y., Nikaido, I., Pesole, G., Kochiwa, H., Kuehl, P., Lewis, S., Matsuo, Y., Nikaido, I., Pesole, G., Guackenbush, J., Schrinh, L.M., Steubli, P., Suzuki, R., Tomita, M., Wagner, L., Washio, T., Sakai, K., Okido, T., Furuno, M., Aono, H., Wagner, L., Washio, T., Sakai, K., Okido, T., Buluco, M., Boluga, N., Fletcher, C., Fujita, M., Gariboldi, M., Gustincich, S., Hill, D., Fletcher, C., Fujita, M., Gariboldi, M., Gustincich, S., Hill, D., Hofmann, M., Hume, D.A., Kamiya, M., Lee, NH., Lyons, P., Nordone, P., Marchionni, L., Mashima, J., Mazzarelli, J., Mombaerts, P., Nordone, P., Ring, B., Ringwald, M., Rodriguez, I., Sakamoco, N., Sasaki, H., Toyo-oka, K., Wang, K.H., Weltz, C., Willming, L., Massedawa, Y., Kawaji, H., Kohtsuki, S.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Shibata, K., Itoh, M., Aizawa, K., Nagaoka, S., Sasaki, N., Carninci, P., Konno, H., Akiyama, J., Nishi, K., Kitsunai, T., Tashiro, H., Itoh, M., Suhi, Y., Nakamura, S., Hazama, M., Nishine, T., Harada, A., Sumamoto, R., Matsumoto, H., Sakaguchi, S., Ikegami, T., Kashiwagi, K., Pujiwake, S., Inoue, K., Togawa, Y., Izawa, M., Ohara, E., Watshiki, M., Ohaza, Y., Ishikawa, T., Ozawa, K., Tanaka, T., Matsuura, S., Kawai, J., Okazaki, Y., Muramatsu, M., Inoue, Y., Kira, A. and Hayshizaki, Y. Rika linegrated sequence analysis (RISA) system-384-format Genome Res. 10 (11), 1757-1771 (2000)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Carninci,P., Shibata,Y., Hayatsu,N., Sugahara,Y., Shibata,K., Itoh,M., Konno,H., Okazaki,Y., Muramatsu,M. and Hayashizaki,Y. Pormalization and subtraction of cap-trapper-selected cDNAs to prepare full-length cDNA libraries for rapid discovery of new genes conserved. (10), 1617-1630 (2000)
                                                                                                                                                                                                                                                                   HTC 19-JAN-2002
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
                                                                                                                                                                                                                                                   Mus musculus adult male cecum cDNA, RIKEN full-length enriched library, clone:9130022E09:unclassifiable transcript, full insert sequence.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  5 (bases 1 to 1588)
Adachi,J., Aizawa,K., Akahira,S., Akimura,T., Aono,H., Arai,A.,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Functional annotation of a full-length mouse cDNA collection Nature 409 (6821), 685-690 (2001) 21085660
                                                                                                                                                                                                                                                                                                                                                                                                                                 AKO18644.1 GI:12858457
HTC; CAP trapped
Mus musculus (strain:C578L/6J) adult male cecum CDNA to MRNA,
clone.lib:RKEN full-length enriched mouse cDNA library
clone:9130022E09.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Carninci, P. and Hayashizaki, Y.
High-efficiency full-length cDNA cloning
Meth. Enzymol. 303, 19-44 (1999)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            and Hayashizaki, Y.
                                                                                        576 TCCTTTCTCCTG 587
                                                         235 ATCTTTCACATG 246
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Mus musculus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            11217851
5 (bases
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       10349636
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    79253
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          JOURNAL
                                                                                                                                                                                                                                                                                                             DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                      ACCESSION
VERSION
KEYWORDS
SOURCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              MEDLINE
PUBMED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        REFERENCE
AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            MEDLINE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            REFERENCE
AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              TITLE
                                                                                                                                                                                                                    RESULT 7
AK018644
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   TITLE
```

0

```
Determination of this BAC-end sequence was carried out as part of a collaboration with the Barkels prosphila Genome Project (BDGP). The BDGP is constructing a physical map of the brosophila melanogaster genome using these BACs. For further information please see http://www.fruitfly.org The BDGP prosophila melanogaster BAC library was prepared by Kazutoyo Osoegawa and Aaron Mammosar in Pieter de Jong's laboratory in the Department of Cancer Genetics at the Roswell Park Cancer Institute in Buffalo, NY. The library is named RPCI-98 and was constructed by partial sogenic strain y2; cn bw sp, the same strain used for the BDGP's and box for library is now by the same strain used for the BDGP's and box to order individual BAC clones, the entire library, or filters for hybridization from the BACPAC Resource Center can be found at http://wacpac.med.buffalo.edu/drosophila_bac.htm.
                                                                                                                                                                                                                                                                                         Submitted (11-JUN-1999) Genoscope - Centre National de Sequencage
BP 191 91006 EVRY cedex - FRANCE (E-mail : segref@genoscope.cns.fr
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ;
0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   BH834109 490 bp DNA linear GSS 20-MAY-2002
BACPP6-K03 z Pristionchus pacificus BAC ends Pristionchus pacificus
Drosophila melanogaster genome survey sequence TET3 end of BAC:
BACR48P19 of RPCI-98 library from Drosophila melanogaster (fruit
                                                                                                                                                                 Eukaryota; Metazoa; Arthropoda; Hexapoda; Insecta; Pterygota;
Neoptera; Endopterygota; Diptera; Brachycera; Muscomorpha;
Ephydroidea; Drosophila
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         61 CACCTTTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAATCGGCCATATAA 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              121 AATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCAT 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   181 CTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCTTT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1.4%; Score 70; DB 17; Length 1101; 45.0%; Pred. No. 4.4e-05;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                406 others
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   97; Indels
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /organism="Drosophila melanogaster"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           151 t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               45.0%; Pred. ...
                                            fly), genomic survey sequence.
AL078714
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /clone_lib="RPCI-98"
/note="end : TET3"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         69 9
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /clone-"BACR48P19"
                                                                                                                         Drosophila melanogaster.
Drosophila melanogaster
                                                                                     AL078714.1 GI:5102004
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               BH834109.1 GI:21034637
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Pristionchus pacificus.
Pristionchus pacificus
                                                                                                                                                                                                                                (bases 1 to 1101)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         genomic, DNA sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ပ
9
                                                                                                                                                                                                                                                                           Direct Submission
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            108; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Similarity
                                                                                                                                                                                                                                                     Genoscope
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         469 a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Best Local
DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  source
                                                                                                                                             ORGANISM
                                                            ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  BASE COUNT
                                                                                                                                                                                                                              REFERENCE
                                                                                                                                                                                                                                                     AUTHORS
                                                                                                                                                                                                                                                                                           JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Matches
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ORGANISM
                                                                                                  KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ACCESSION
                                                                                                                                                                                                                                                                                                                                                       COMMENT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               BH834109
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          RESULT 9
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    VERSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            SOURCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         QQ
```

```
Srinivasan,J., Sinz,W., Lanz,C., Brand,A., Nandakumar,R., Raddatz,G., Witte,H., Keller,H., Kipping,I., Pires da Silva,A., Jesse,T., Millare,J., de Both,M., Schuster,S.C. and Sommer,R.J. A BAC-based genetic linkage map of the nematode Pristionchus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Gu,J., Zhao,M., Huang,Q., Xu,X., Li,Y., Peng,Y., Song,H., Xiao,H., Gu,Y., Li,N., Qian,B., Liu,F., Qu,J., Gao,X., Cheng,Z., Xu,Z., Zeng,L.,X.,S., Gu,W., Tu,Y., Jia,J., Fu,G., Ren,S., Zhong,M., Lu,G., Yang,Y., Gao,G., Wang,Z., Zhang,Q., Chen,S., Han,Z. and Chen,Z. Unpublished (2000)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       EST 19-OCT-2000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Eukaryofa, Metazoa, Chordata, Craniata, Vertebrata, Euteleostomi,
Mammalia, Eutheria, Primates, Catarrhini, Hominidae, Homo.
1 (bases 1 to 821)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Contact: Zeguang Han
Chinese National Human Genome Center at Shanghai
351 Guo Shoujing Road, Zhangjiang Hi-Tech Park, Pudong, Shanghai
201203, P. R. China
Tel: 86-21-50801919(ex.45)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            AV758661 BM Homo sapiens cDNA clone BMFAEF02 5', mRNA sequence.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               91 TIAAAAAATAGTATAAATCGGCCATATAAAATGGTATAATCTTTCATCTTTCATCTTTA 150
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       172 TICAAACITIGGICICITAATCITIAATCITCATIATCIGATCITICACAICIGAIAGTIG 231
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  151 ATCTITCATCTITCATCTITCATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCATCT 210
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Gaps
Eukaryota, Metazoa, Nematoda, Chromadorea, Diplogasterida,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Score 69.6; DB 17; Length 490; Pred. No. 4.9e-05;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /clone_lib="Pristionchus pacificus BAC ends"
106 c 72 q 201 t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Indels
                                                                                                                                                                                                                      Evolutionary Biology
Max-Planck-Institute for Developmental Biology
Spemannstr. 37-39, Tuebingen D-72076, Germany
Tel: 00497071601371
                                                                                                                                                                                                                                                                                                                                                                                                                        /organism="Pristionchus pacificus"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    This clone is available at CHGC in Shanghai. Location/Qualiflers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         0; Mismatches
                                                                                                                                                                                                                                                                                                           Fax: 00497071601498
Email: ralf.sommer@tuebingen.mpg.de
                                                                                                                                                                                                                                                                                                                                                                                                                                               /strain="var. California"
/db_xref="taxon:54126"
                       Neodiplogasteridae; Pristionchus.
1 (bases 1 to 490)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /organism="Homo sapiens"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         211 TTCATCTTTCATCTTTCATCT 238
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 292 TTAGTCTCTCATCTCTGATCTTTGATCT.319
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               72 g
                                                                                                                                                                                                                                                                                                                                                                                  Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /db_xref="taxon:9606"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    AV758661
AV758661.1 GI:10916509
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Email: hanzg@chgc.sh.cn
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Query Match 1.4%;
Best Local Similarity 66.9%;
Matches 99; Conservative (
                                                                                                                                                                                                   Contact: Sommer RJ
                                                                                                                                                                            Unpublished (2002)
                                                                                                                                                                                                                                                                                                                                                                                                     .490
                                                                                                                                                                                                                                                                                                                                                        Class: BAC ends
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Homo sapiens
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         AV758661
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             human.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Query Match
                                                                                                                                                                                                                                                                                                                                                                                                     source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              DEFINITION
                                            REFERENCE
                                                                                                                                                                            JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    AV758661/c
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   RESULT 10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ACCESSION
                                                                                                                                                                                                                                                                                                                                                                           FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             JOURNAL
                                                                                                                                 TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         VERSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    â
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
```

Ω δλ

```
/Strain="mm::nmss"
//db_rafe="mm::nmss"
//do.rafe="weaton:5759"
//do.rafe="weaton:5759"
//clone_lib="Entamobab histolytica Sheared DNA"
//clone_lib="Entamobab histolytica Strain Constructed at The
//note="weaton: ph051; Site_1: Bst i; Constructed at The
//note="weaton: ph051; Site_1: Bst i; Constructed at The
Genomic DNA isolated from broth cultures of E. histolytica
using a method described by Clark and Diamond (Clark,
C.G., and Diamond, L.S. (1993) Entamobab histolytica: a
method for isolate identification. Exp. Parasitol.
//r450.). The DNA was mechanically sheared to give a
//r450.). The DNA was mechanically sheared to give a
//r450.). The DNA was mechanically sheared to give a
//r450.). The DNA was mechanically sheared to give
//representation of the instruction is described in detail in Smith,
the library construction is described in detail in Smith,
the library construction sequencing projects. In Genome
sequencing: A Practical Approach, eds. M. Vaudin and B.
Barell, Oxford University Press, 1999)."
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Entamoeba histolytica

Eukaryota; Entamoebidae; Entamoeba.

1 (bases 1 to 848)

2 Loftus, B., Van Aken, S. and Fraser, C.

1 Loftus, B., Van Aken, S. and Fraser, C.

2 Loftus, B., Van Aken, S. and Fraser, C.

2 Loftus, B., Van Aken, S. and Fraser, C.

3 Loftus, B., Van Aken, S. and Fraser, C.

4 Lopublished (2000)

3 Loftus

4 Lopublished (2000)

4 Lopublished (2000)

5 Loftus

5 Loftus

5 Loftus

6 Longus

7 Lopublished (2000)

8 Rays 304 38 3543

8 Email: bjloftusettigr.org

8 Clones are derived from the Entamoeba histolytica HM1:IMSS sheared
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GSS 14-NOV-2000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          A2549808 848 bp DNA linear GSS 14-NOV-200
ENTFZ62TF Entamoeba histolytica Sheared DNA Entamoeba histolytica
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      293 AGCTGAACGAACGCAAATGATAAAGTAATTTAATTGTTCAACTAACCTTAGGAGAAAAA 352
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  173 ICTTICATCITICATCITICATCITICATCITICATCITICATCITICATCITICATCITICATCIT 232
                                                                                                                                                                                                                                                                                                                                                                             113 CCATATAAAATGGTATAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCA 172
                                                                                                                                                                           670 MSTWMAAAAAWTACTWITTAAMCCMTTTAHTWMCAWWWWTYYYTTTCWAAMFTTC 729
                                                          0; Gaps
, Match 1.4%; Score 68.8; DB 17; Length 1101; Local Similarity 40.1%; Pred. No. 8.3e-05; hes 109; Conservative 51; Mismatches 112; Indels 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /organism="Entamoeba histolytica"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          353 TGAACAAGATATATCGTCTCAAATTCAGCAAA 384
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    910 AAAAAAASSAAAASVRCSSAAASAAAAAAAA 941
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   High quality sequence start: 19
High quality sequence stop: 421.
Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   DNA library
Seq primer: M13-Forward
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              AZ549808.1 GI:11174572
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Entamoeba histolytica.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            genomic, DNA sequence.
AZ549808
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Class: shotgun
                         Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        JOURNAL
                                                                                       Matches
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  RESULT 12
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            AZ549808
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         VERSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       SOURCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   q
                                                                                                                                                                                                                                                                                                                                     pp
                                                                                                                                                                                                                                                                                                                                                                                                   δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Lusoulff,
Drosophila melanogaster genome survey sequence T7 end of BAC
BANNIPL2 of DrosBAC library from Drosophila melanogaster (fruit
ALI07965
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Direct Submission
Submitted (23.JUL-1999) Genoscope - Centre National de Sequencage :
Submitted (23.JUL-1999) Genoscope - Centre National de Sequencage :
PP 191 91006 ENRY cedex - FRANCE (E-mail : segref@genoscope.cns.fr

- Web : www.genoscope.cns.fr

- Web : www.genoscope.cn
                                                                                                                                                                                                                                                                                                                                                                             ;
0
                                                                                                                                                                               /note="Vector: prriplEx2; Site_1: sfilA; Site_2: sfilB" 139 c 111 g 257 t 3 others
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  124 GGIATAAICTITCAICTITCAICTITAAICTITCAICTITCAICTITCATCTITCATCTI 183
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /tissue_type="Bone marrow"
/cell_type="CD34+ hematopoietic stem/progenitor cell"
/lab_host="BM25.8"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 64 CTTTTTGCAGTCTATATGCAAATATTTTAAAAAATAGTATAAAATCCGCCATATAAAAT 123
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Drosophila melanogaster.
Drosophila melanogaster.
Bukaryota; Metazoa; Arthropoda; Hexapoda; Insecta; Pterygota;
Neoptera; Endopterygota; Diptera; Brachycera; Muscomorpha;
Epydroidea; Drosophilidae; Drosophila.
                                                                                                                                                                                                                                                                                                                                                                                                                                    Gaps
                                                                                                                                                                                                                                                                                                                                                                             0
                                                                                                                                                                                                                                                                                                    1.4%; Score 69.6; DB 10; Length 821;
55.1%; Pred. No. 5.3e-05;
tive 0; Mismatches 110; Indels 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         204 others
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /organism="Drosophila melanogaster"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         242 t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           /db_xref="taxon:7227"
/clone="BACN17P12"
/clone_lib="DrosBAC"
/plasmid="pBeloBAC11"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     108 g
                                        /clone="BMFAEF02"
/clone_lib="BM"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /note="end : T7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                AL107965.1 GI:5628269
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            103 c
                                                                                                                                                                                                                                                                                                                                                                                     Conservative
                                                                                                                                                                                                                                                                                                                                                       Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                444 a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      pBeloBAC1]
                                                                                                                                                                                                                                      311 a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             244 ATGAA 248
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        339 ACAAA 335
                                                                                                                                                                                                                                                                                                                                                                                        135;
                                                                                                                                                                                                                                                                                                                                 Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Source
                                                                                                                                                                                                                                                                                                                                                                  Best Local
Matches 13
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 TITLE
JOURNAL
                                                                                                                                                                                                                                  BASE COUNT
ORIGIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          RESULT 11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    CNS017F7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      COMMENT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ŏ
```

```
=
=
=
                                                                                                                                                                       Debaryomyces hansenii.
                                                                                                                                                                                      Debaryomyces hansenii
                                                                                                                                                                                                                                                                                                                                                                                                (bases 1 to 1063)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (bases 1 to 1063)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               44.28;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Query Match
Best Local Similarity 44.2%
Matches 110; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              =
=
-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Genoscope
                                                                                                                             AL436064
                                                                                                                                                                                                                                                                                                                                                                                   11152876
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           11152889
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             =
=
                                                         RESULT 14
CNS07A2Y/C
                                                                                                 DEFINITION
                                                                                                                                                                                    ORGANISM
                                                                                                                             ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                           REFERENCE
AUTHORS
                                                                                                                                                                                                                           REFERENCE
                                                                                                                                           VERSION
KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        BASE COUNT
                                                                                                                                                                                                                                                                                                                                                 JOURNAL
                                                                                                                                                                                                                                                                                                                                                                   MEDLINE
                                                                                                                                                                                                                                                                                                                                                                                PUBMED
                                                                                                                                                                                                                                                                                                                                                                                                                                                               JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             MEDLINE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           PUBMED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               JOURNAL
                                                                                                                                                                                                                                                                                                                         TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                    TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       COMMENT
                                                                                                                                                                     SOURCE
                                                                                     LOCUS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ORIGIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                 ;
0
                                                                                                                                                                                                                                                                                                                                                                          GSS 13-DEC-2001
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Eukaryota; Viridiplantae; Streptophyta; Embryophyta; Tracheophyta; Spermatophyta; Magnoliophyta; eudicotyledons; core eudicots; Rosidae; eurosids II; Brassicales; Brassicaceae; Brassica.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        0;
                                                                               Gaps
                                                                                                                         68 ITTGCAGTCTATATGCAAATATTTTAAAAAATAGTATAAATCCGCCATATAAAATGGTA 127
                                                                                                                                                                                128 TAATCTITCATCTITCATCTITAATCTITCATCTITCATCTITCATCTTTCATCTTTCAT 187
                                                                                                                                                                                                                           128 TAATCTTTCATCTTTCATCTTTAATCTTTCATCTTTCATCTTTCATCTTTCATCTTTCAT 187
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /clone="boot"
/clone_lib="BoGJ"
/clone_lib="BoGJ"
/note="Vector: pHOS1; Site_1: BstXI; 2-3 kb sheared
genomic DNA inserted into pHOS1 using BstXI linkers"
136 q 29 t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     0; Gaps
                                                                                                                                                                                                                                                                                                                                                                             BOGJZ72TR BOGJ Brassica oleracea genomic clone BOGJZ72, DNA
                                                                                                                                                                                                                                                                188 CITICAICITICAICITICAICITICAICITICAICITICAICITICAICITI 240
                                                                                                                                                                                                                                                                                Score 68.2; DB 17; Length 848;
Pred. No. 0.00011;
0; Mismatches 103; Indels 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           188 CITICATCTITCATCTITCATCTITCATCTITCATCTITCATCTITC 241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Fax: 301-838-0208
Email: cdtown@tigr.org
DNA is from a doubled haploid provided by Tom Osborn.
Seq primer: TR
Class: sheared ends.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Score 67.6; DB 17; Length 372;
Pred. No. 0.00013;
0; Mismatches 29; Indels 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1 (bases 1 to 372)

Town,C.D., Van Aken,S., Utterback,T. and Fraser,C.M. Whole genome shotgun sequencing of Brassica oleracea Other_GSSs: BOGJZ72TF
Contact: Chris Town
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Medical Center Drive, Rockville, MD 20850, USA.
                                                                                                                                                                                                                                                                                                                                                                         linear
                                                                                                                                                                                                                                                                                                                                                                       DNA
       501 t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /organism="Brassica oleracea"
/strain="TO1000DH3"
                                                                                                                                                                                                                                                                                                                                                                       372 bp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /db_xref="taxon:3712"
/clone="BOGJZ72"
    51 9
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                       BH478403.1 GI:17686514
                                            1.4%;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Query Match
1.4%;
Best Local Similarity 74.6%;
Matches 85; Conservative
    54 c
                                       Query Match
Best Local Similarity 55.8%
Matches 130; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                   Brassica oleracea.
                                                                                                                                                                                                                                                                                                                                                                                                                                                               Brassica oleracea
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                301-838-3523
301-838-0208
    242 a
                                                                                                                                                                                                                                                                                                                                                                                               sednence.
                                                                                                                                                                                                                                                                                                                                                                 BH478403
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Te1:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Query Match
BASE COUNT
ORIGIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                source
                                                                                                                                                                                                                                                                                                                                                 BH478403/C
                                                                                                                                                                                                                                                                                                                                                                             DEFINITION
                                                                                                                                                                                                                                                                                                                                                                                                                                                            ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          TITLE
                                                                                                                                                                                                                                                                                                                                                                                                        ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                                       VERSION
KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        COMMENT
                                                                                                                                                                                                                                                                                                                                                                                                                                                SOURCE
                                                                                                ô
                                                                                                                          g
                                                                                                                                                     δ
                                                                                                                                                                                q
                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                 δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            á
```

```
Direct Submission

Submitted (08-SEP-2000) Genoscope - Centre National de Sequencage,

2 rue Gaston Cremieux. CP 5706, 91057 EWY cedex - FRANCE (E-mail:

Seqref@genoscope.ons.fr - Web: www.genoscope.ons.fr)

This GSS is part of a random genomic sequencing program of thirteen
yeast species: Saccharomyces bayanus var. uvarum, Saccharomyces
exiguus, Saccharomyces servazzii, Zygosacharomyces rouxii,
Saccharomyces kluyveri, Kluyveromyces thermotolerans, Kluyveromyces
angusta. Debaryomyces hansenii var. hansenii, Pichia sorbitophila,
Candida tropicalis and Yarromya lipolytica. Genomic inserts of 3 to
Keywords for description of this sequenced. See

keywords for description of this sequence and for the sequence of
CNSO7A2Y 1063 bp DNA linear GSS 08-JUL-2001 T3 end of clone BCOAA001B01 of library BCOAA from strain CBS 767 of Debryomyces hansenli, genomic survey sequence.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ö
                                                                                                                                                                                                                                                                                                                                                                  Souciet, J. L. Aigle, M., Artiguenave, F., Blandin, G., Bolotin-Fukuhara, M., Bon, E., Brottier, P., Casaregola, S., de-Montigny, J., Dujon, B., Durrens, P., Lephngle, A., Llorente, B., Malpertuy, A., Neuveglise, C., Ozier-Kalogeropoulos, O., Potier, S., Saurin, W., Tekaia, F., Toffano-Nioche, C., Wesolowskii-Louvel, M., Mincker, P., and Weissenbach, J.
                                                                                                                                                                                                                                                                    Eukaryota, Fungi, Ascomycota, Saccharomycotina, Saccharomycetes, Saccharomycetales, Saccharomycetaceae, Debaryomyces.

1 (bases 1 to 1063)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Genomic exploration of the hemiascomycetous yeasts: 1. A set of yeast species for molecular evolution studies
FEBS Lett. 487 (1), 3-12 (2000)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Lepingle, A., Casaregola, S., Neuveglise, C., Bon, E., Nguyen, H., Artiquenave, F., Wincker, P. and Gaillardin, C. Genomic exploration of the hemiascomycetous yeasts: 14. Debaryomyces hansenli var. hansenli FEBS Lett. 487 (1), 82-86 (2000)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           62 ACCTITTTTGCAGTCTATATGCAAATATTTTAAAAAATAGTATAAATTCGCCATATAAA 121
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   2 AAATATACAAGATAATAAAATAAATCAAGATTTTTGTGATGACAACAACAATTACAAC 61
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1.4%; Score 67.6; DB 17; Length 1063;
44.2%; Pred. No. 0.00015;
Ive 34; Mismatches 105; Indels 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              195 others
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = = ::: ...
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /organism="Debaryomyces hansenii"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          328 t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      the other extremity of this insert. Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /db_xref="taxon:4959"
/clone="BC0AA001B01"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /variety="hansenii"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      167 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         /clone_lib="BC0AA"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /strain="CBS 767
                                                                                                                                         AL436064.1 GI:12219477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /note="end : T3
100 c 16
```

```
AQ347002 342 bp DNA linear GSS 07-MAY-1999 RPCI11-116J22.TV RPCI-11 Homo sapiens genomic clone RPCI-11-116J22,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Email: hbe@tigr.org
Clones are derived from the human BAC library RPCI-11. For BAC
library availability, please contact Pieter de Jong
(pleter@deJong.med.buffalo.edu). Clones may be purchased from
BACPAC Resources (http://bacpac.med.buffalo.edu/ordering) or from
Research Genetics (info@resgen.com). BAC end search page:
http://www.tigr.org/tdb/humgen/bac_end_search/bac_end_search.html
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
1 (Dases 1 to 342)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Zhao, S., Adams, M.D., Nierman, W., Malek, J., de Jong, P. and Venter
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Use of BAC End Sequences from Library RPCI-11 for Sequence-Ready
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /sell_type="Lymphocytes"
/cell_type="Lymphocytes"
/note="Wector: pBACe3.5; Site_1: EcoRI; Site_2: EcoRI;
RPCIII Human Male BAC Library"
f c 31 q 147 t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  65 ITTTTTGCAGTCTATATGCAAATATTTTAAAAAAATAGTATAAAATTGC 124
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      316 TATATATCATATATATATATATCATATATATATCATATATATATATCATATATCATATATC 257
                                                                                                                                      182 TITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTITCAICTITC 241
829 TITTITITITITITITITITITAMCCCTIXCOTCXITTCXYYYYYYYYYYYYXYXCCCCC 770
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           0; Gaps
                                                                       122 AIGGIATAAICITICAICITICAICITIAAATCITICAICITICAICITICAICITITCAIC 181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Query Match 1.3%; Score 66; DB 17; Length 342; Best Local Similarity 59.7%; Pred. No. 0.00031; Matches 111; Conservative 0; Mismatches 75; Indels
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Contact: Shaying Zhao, William Nierman, Mark Adams Department of Eukaryotic Genomics
The Institute for Genomic Research 9712 Medical Center Dr., Rockville, MD 20850
Fax: 301 838 0200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /organism="Homo sapiens"
/db_xref="GDB:7544397"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /db_xref="taxon:9606"
/clone="RPCI-11-116J2"
/clone_lib="RPCI-11"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   AQ347002.1 GI:4171898
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Unpublished (1997)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ends.
                                                                                                                                                                                                                                                                                                                                                                                                                                                             DNA sequence.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Map Building
                                                                                                                                                                                                                                            242 ACATGAAAT 250
                                                                                                                                                                                                                                                                                     769 AAAAMAMAH 761
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             158 a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            source
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             BASE COUNT
                                                                                                                                                                                                                                                                                                                                                                                                              LOCUS
DEFINITION
                                                                                                                                                                                                                                                                                                                                                          RESULT 15
AQ347002/c
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ORGANISM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   JOURNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ACCESSION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  REFERENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      VERSION
KEYWORDS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           AUTHORS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   FEATURES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       TITLE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Óλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ф
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ŏ
                                                                                                                                                                                          ВÞ
                                                                                                                                              ò
```

	nt			
· <del>-</del>	`			
		•		
				, ,
		·		

```
(without alignments)
4278.504 Million cell updates/sec
                                                                                                                                                                                                                                                                                                                                             7407
1 MNKIYRLKFSKRLNALVAVS......CFSSGNGARVCTNVADDGQP 1477
                                                                        March 24, 2003, 15:20:59; Search time 46 Seconds
GenCore version 5.1.4_p5_4578 Copyright (c) 1993 - 2003 Compugen Ltd.
                                                                                                                                                                                                                                Total number of hits satisfying chosen parameters:
                                                                                                                                                                                                     908470 seqs, 133250620 residues
                                                                                                                                                                                                                                                                                       Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries
                                                 OM protein - protein search, using sw model
                                                                                                                                                                     Scoring table: BLOSUM62 Gapox 10.5
                                                                                                                                                                                                                                                                                                                                         A_Geneseq_101002:*
                                                                                                                                                                                                                                                        Minimum DB seq length: 0
Maximum DB seq length: 2000000000
                                                                                                                      US-10-092-880-4
                                                                                                                                    Perfect score:
                                                                                                                                                                                                                                                                                                                                             Database :
                                                                                                                                                                                                           Searched:
                                                                                                                                                sednence:
                                                                          Run on:
                                                                                                                        Title:
```

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

	Description	High molecular wei	Non-typeable Haemo	Haemophilus influe	Haemophilus high m	High molecular wei	Non-typeable Haemo	Haemophilus influe	High molecular wei	High molecular wei	Non-typeable Haemo
	ID	AAR41724	AAW30294	AAB01848	AAR63506	AAR41728	AAW30292	AAB01849	AAR41723	AAR41732	AAW30293
	DB	14	18	21	15	14	18	21	14	14	18
	Query Match Length DB ID	1477	1477	1477	1477	1477	1601	1036	1536	1529	1536
æ	Query Match	99.8	0.66	98.0	97.9	97.1	71.3	69.7	67.1	6.99	6.99
	Score	7389	7336	7261	7252	7193	5284	5164	4967	4957	4956
	Result No.	1	7	3	4	S	9	7	80	6	10

14943 66.7   1336 21   AMESTSOS   Heamophillus influeration   14943 66.5   1356 21   AMESTSOS   Heamophillus influeration   14944 66.5   1356 21   AMESTSOS   Heamophillus influeration   14944 66.5   1356 21   AMESTSOS   Heamophillus influeration   15   325.5   64.7   1398   18   AMANTOSO   Heamophillus influeration   16   325.0   44.0   959 21   AMBORISTOS   Heamophillus influeration   15   325.5   44.0   959 21   AMBORISTOS   Heamophillus influeration   15   325.0   40.0   10.0								
2 4443 66.7 1336 14 AAMA1724 Histophillus in the composition of the co	11	49		20 1		AAR63505		o i
4 77472 67 1558 1 AAM1313 High moleculars (2.5525 47 6 1558) 14 AAM1313 High moleculars (2.5525 47 6 1558) 14 AAM1313 High moleculars (2.5525 47 6 1558) 14 AAM1313 High moleculars (2.5525 44.0 1079 21 AAM1313 High moleculars (2.5525 44.0 1079 21 AAM1324 High moleculars (2.5525 44.0 1079 21 AAM1324 High molecular weight protein; 1477 AA. AAM132  High molecular weight protein; 1478 AA. AAM2330 High molecular weight protein; 1478 AA. AAM1324 High molecular weight protein; 1478 AA. AAM1324 High molecular weight protein; 1478 AA. AAM1324 High molecular weight protein; 1478 AA. AAM2320 High molecular weight protein; 1478 AA. AAM1324 High molecular weight protein; 1478 AA. AAM1324 High molecular weight protein; 1478 AA. AAM1324 High molecular weight protein; 1488 AA. AAM2920 High molecular weight protein; 1488 AAA49207 High molecular weight protein; 1488 AAA49207 High molecular weight protein; 148	12	4.4	· .	uп		AABU1846		molecul
7 3321. 5 47.6 1338 1.7 ANGHI331 High molecular weight protein to 1079 2.1 AABDI339 Hemophilus in 1079 2.1 AABDI342 Hemophilus in 1079 2.1 AABDI344 Hemophilus in 1070 2.1 AABDI344 Hemophilus	13	44.4	-	ດທ		AAK41/23 AAW30291		Hae
6 33615 45.4 953 21 AAB01838 Hisemophiliss 3726 44.0 1079 21 AAB01834 Hisemophiliss 3726 44.0 1079 21 AAB01842 Hisemophiliss 3727 43.6 1075 21 AAB01842 Hisemophiliss 37 1070 21 AAB01842 Hisemophiliss 37 1070 21 AAB01842 Hisemophiliss 37 1070 21 AAB01842 Hisemophiliss 38.2 1004 21 AAB01842 Hisemophiliss 38.2 1004 21 AAB01840 Hisemophiliss 38.2 1004 21 AAB01840 Hisemophiliss 38.2 1004 21 AAB01840 Hisemophiliss 37 1070 21 AAB01842 Hisemophiliss 37 1070 21 AAB0	15	3525		'n		AAR41731		н
6 2255 6 41.0 0 594 21 ARB01845 Hademophillus and accompillus accompilius accompil	16	3361		963		AAB01838		
9 3225	18	33		966		AAB01842		infl
1 3225.5 4 3.5 1073 21 AND1837 Hismorphiliss 2 3184 4 3.0 5 25 1 AND1837 Hismorphiliss 3 184 4 3.0 5 25 1 AND1837 Hismorphiliss 3 184 4 3.0 5 25 1 AND1837 Hismorphiliss 3 184 4 3.0 5 25 1 AND1837 Hismorphiliss 3 184 4 3.0 5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	119	3256	<u>.</u>	1079		AAB01836		
2 3134 43.6 97.5 12 AB01825 Haemophilus and selection and	20	3000	, ,	$\nu$ c		AABU1843 AABU1837		infl
3 315 3 42 6 96 91 ABBOINES7	22	31		ຸດ		AAB01826		infl
4. 2970.5 40.1 1011 21 AAB01832 Historophilius 20.2999.5 5 40.1 1011 21 AAB01832 Historophilius 20.2999.5 5 40.1 1011 21 AAB01831 Historophilius 2763 37.3 1005 21 AAB01840 Historophilius 2763 37.3 1005 21 AAB01847 Historophilius 2763 37.3 1005 21 AAB01847 Historophilius 2763 37.3 1005 21 AAB01847 Historophilius 26.0 1005 21 AAB01845 Historophilius 26.0 1005 21 AAB01828 Historophilius 26.0 1005 21 AAB01828 Historophilius 20.1 12.2 1188 21 AAB01829 Historophilius 20.1 12.2 12.2 12.2 12.2 12.2 12.2 12.2	23	31	ά.	on 4		AAB01827		intl
2864   287   110	24	2970		$\supset c$		AABU1832		
10	0 70	200	n a			AABO1833		infl
### 2763 37.3 1095 21 AAB01847 Heamophilus 2770 36.6 1095 21 AAB01834  2771 37.0 1005 21 AAB01834  2771 36.6 1095 21 AAB01835  4 AAB01824  4 2669.5 35.2 1188 21 AAB01825  4 AAB01845  5 5501.5 35.2 1188 21 AAB01845  5 57 1222 21 AAB01848  5 57 1222 21 AAB01848  6 2561.5 34.6 1228 21 AAB01848  6 2561.5 34.6 1228 21 AAB01830  6 2561.5 34.6 1282 21 AAB01830  7 2571.1 AAB01830  7 2571.1 AAB01830  8 2581.6 1282 21 AAB01830  8 2581.6 1282 21 AAB0183	27	28		$\sim$		AAB01841		infl
10   274   37.0   1101   21   AAB01834   Haemophilus   2678   36.2   1227   21   AAB01824   Haemophilus   2688   36.2   1227   21   AAB01825   Haemophilus   2609.5   35.2   1287   21   AAB01825   Haemophilus   2609.5   35.2   1180   21   AAB01845   Haemophilus   2609.5   35.2   1180   21   AAB01845   Haemophilus   2609.5   35.2   1180   21   AAB01840   Haemophilus   2609.5   35.2   1180   21   AAB01828   Haemophilus   2525.5   35.0   1228   21   AAB01829   Haemophilus   2525.5   35.0   2128   21   AAB01829   Haemophilus   2525.5   35.0   2128   21   AAB01830   Haemophilus   2525.5   35.0   2128   21   AAB01830   Haemophilus   2525.5   35.0   2128   22   AAB01830   Haemophilus   2525   241   23   AAB01830   Haemophilus   2525   241	28	27	7	$\circ$		AAB01847		
11 2678 36.2 1095 21 AAB01825 Hammophilus 2 2647 35.7 1221 21 AAB01825 Hammophilus 2 2647 35.7 1221 21 AAB01825 Hammophilus 2 2647 35.7 1221 21 AAB01845 Hammophilus 2 2667 35.2 1188 21 AAB01845 Hammophilus 2 2667 35.2 1188 21 AAB01828 Hammophilus 2 2552.3 35.0 1228 21 AAB01829 Hammophilus 2 2562.5 35.0 1228 21 AAB01829 Hammophilus 2 2562.5 35.0 1228 21 AAB01829 Hammophilus 2 266.5 35.0 1228 21 AAB01829 Hammophilus 2 268.5 35.0 1228 21 AAB01831 Hammophilus 2 268.5 36.0 1981 19 AAB28860 Hammophilus 2 268.5 2411 27 AAB28860 Hammophilus 2 269.6 2 1981 19 AAB28860 Hammophilus 1 1477 AA.  AAR41724 standard; Protein; 1477 AA.  AAR41724 standard; Protein; virus; vaccine; influenza; epitope; immunity; hammophilus influenzae.  Hammophilus influenzae.  WO9319090-A.  30-SEP-1993; 93WO-US02166.  16-WAR-1992; 92GB-0005704.  (BARE) BARENKAMP S J.  (INRW ) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ;  WPI: 1993-320683440.  WPPI: 1993-320683440.  High molecular weight surface proteins - of non-typeable hammophilus which exhibit imminogenic properties	29	27	۲,	~ (		AAB01834		
12 26.7 35.7 122.1 21 ANBO1823 Hamophilus and 2600.5 35.2 1180 21 ANBO1845 Hamophilus and 2600.5 35.2 1180 21 ANBO1845 Hamophilus and 2600.5 35.2 1180 21 ANBO1844 Hamophilus and 2600.5 35.0 1228 21 ANBO1848 Hamophilus and 2600.5 35.0 1228 21 ANBO1849 Hamophilus and 2600.5 35.0 1228 21 ANBO1849 Hamophilus and 260 255.1 34.0 1228 21 ANBO1830 Hamophilus and 260 50.0 1978 20.0 AAN27230 Amino acid and 260 50.0 1981 21 AAN2360 Hamophilus and 260 50.0 1981 21 AAN2360 Hamophilus and 260 50.0 1981 21 AAN2360 Hamophilus and 27.0 1981 21 AAN29393 Hamophilus and 27.0 1981 21 AAN29393 Hamophilus and 27.0 1981 21 AAN29393 Hamophilus and 27.0 1981 21 AAN29309 Hamophilus and 27.0 1981 21 AAN29309 Hamophilus and 27.0 1981 21 AAN3940 Hamophilus and 27.0 1982 20.0 1982 2	30	7 6	o u	<b>-</b> (		AABU1635		
18	3.2	7 6	່ທ	4 (1		AAB01825		
Mail	1 m	2609	. n			AAB01845		
15   12   12   12   12   12   12   13   14   16   16   16   16   16   16   16	34	2609	ď.			AAB01844		
10	35	2592	'n.	(41		AAB01828		emophilus
1	36	256.	4.1	. 4 (		AABUIB3U		Intiuenza
10   508   6.9   314   21   508   619   314   21   508   619   314   21   508   619   314   21   508   619   314   21   508   619   314   21   508   619   314   21   508   619   314   21   508   619   6	37			٠, ٥		AABU1629		Ú
1981   19   1981   19   1981   19   19	0 Ø	7				AAB01831		Haemophilus influ
11 498.5 6.7 2411 21 AAB29360 Haemophilus 12 489 6.6 2123 22 AAE0701 14 489 6.6 2123 22 AAE0701 15 476 6.4 1532 20 AAY27231  ALIGNMENTS  ALIGNMENTS  ARA1724 standard; Protein; 1477 AA.  AAR41724;  26-APR-1994 (first entry)  High molecular weight protein; virus; vaccine; influenza; epitope; immunity; haemophilus influenzae.  WO9319090-A. 30-SEP-1993.  16-MAR-1992; 92GB-0005704.  (BARE/) BARENKAMP S J.  (INRM ) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ;  WPF: 1993-32068340.  High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties	40					AAW42634		Ē
12 491 6.6 2353 17 AAR93933 Haramophilus 13 489 6.6 23243 22 AAR66005 14 489 6.6 3241 23 AAG66005 15 476 6.4 1532 20 AAV27231 10AR41724 standard, Protein; 1477 AA.  AAR41724 Standard, Protein; 1477 AA.  AAR41724  26-APR-1994 (first entry) High molecular weight protein; virus; vaccine; influenza; epitope; immunity; haemophilus influenzae.  MO9319090-A.  30-SEP-1993. 16-MAR-1993; 92GB-0005704. (EARE/) BARENKAMP S J. (INRM ) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ; WPI; 1993-3206834A0. High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties	41	498				AAB23860		
15 489 6.6 2123 22 AAR26001 16 476 6.4 1532 20 AAY27231  ALIGNMENTS  ALIGNMENTS  ARA41724  ARA41724;  26-APR-1994 (first entry)  High molecular weight protein; virus; vaccine; influenza; epitope; immunity; haemophilus influenzae.  WO9319090-A.  30-SEP-1993; 93WO-US02166.  16-MAR-1992; 92GB-0005704.  (IRRM) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ;  WPI: 1993-320683/40.  High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties	42	•				AAR99393		ທີ່
ALIGNMENTS  ALIGNMENTS  ALIGNMENTS  ALIGNMENTS  ALIGNMENTS  ARA1724  AAR41724 standard; Protein; 1477 AA.  AAR41724;  26-APR-1994 (first entry)  High molecular weight protein; virus; vaccine; influenza; epitope; immunity; haemophilus influenzae.  Haemophilus influenzae.  WO9319090-A.  30-SEP-1993.  16-MAR-1992; 92GB-0005704.  (BARE/) BARENKAMP S J.  (INRM) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ;  WPI; 1993-32068340.  High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties	43	•				AAE00/01 AAG66005		_
ALIGNMENTS  1724  AAR41724 standard; Protein; 1477 AA.  AAR41724;  26-APR-1994 (first entry)  High molecular weight protein 2 (HMW2).  High molecular weight protein; virus; vaccine; influenza: epitope; immunity; haemophilus influenzae.  Wo9319090-A.  30-SEP-1993.  16-MAR-1993; 93WO-US02166.  16-MAR-1992; 92GB-0005704.  (HARE/) BARENKAMP S J.  (HARE/) BARENKAMP S J.  (HARE) BARENKAMP S J.  High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties	44					AAY27231		acid sequ
LT 1  AAR41724 standard; Protein; 1477 AA.  AAR41724;  26-APR-1994 (first entry)  High molecular weight protein 2 (HMW2).  High molecular weight protein; virus; vaccine; influenza:  High molecular weight protein; virus; vaccine; influenza:  Haemophilus influenzae.  WO9319090-A.  30-SEP-1993.  16-MAR-1992; 92GB-0005704.  (HARE/) BARENKAMP S J.  (HARE/) BARENKAMP S J.  (HARE/) BARENKAMP S J.  High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties						ALIGNMENTS		
AAR41724 standard; Protein; 1477 AA.  AAR41724; 26-APR-1994 (first entry) High molecular weight protein; virus; vaccine; influenza epitope; immunity; haemophilus influenzae.  Haemophilus influenzae.  WO9319090-A.  30-SEP-1993.  16-MAR-1993; 93WO-US02166.  16-MAR-1992; 92GB-0005704.  (BARE/) BARENKAMP S J.  (IRNA) INSERN INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ; WPI; 1993-320683/40.  High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties								•
AAR41724; 26-APR-1994 (first entry) High molecular weight protein 2 (HMW2). Hugh molecular weight protein; virus; vaccine; influenza epitope; immunity; haemophilus influenzae. Haemophilus influenzae. WO9319090-A. 30-SEP-1993. 16-MAR-1993; 93WO-US02166. 16-MAR-1992; 92GB-0005704. (BARE/) BARENKAMP S J. (INRM ) INSERM INST NAT SANTE & RECH MEDICALE. Barenkamp SJ; WPI; 1993-320683/40. High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties	-	24 AR41724 S	andard		'n.	477		
AAR41724; 26-APR-1994 (first entry) High molecular weight protein 2 (HMW2). High molecular weight protein; virus; vaccine; influenzaepitope; immunity; haemophilus influenzae. Haemophilus influenzae. W09319090-A. 30-SEP-1993. 16-MAR-1992; 92GB-0005704. (BARE/) BARENKAMP S J. (INRM ) INSERM INST NAT SANTE & RECH MEDICALE. Barenkamp SJ; WPI; 1993-320683/40. High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties					ì			
26-APR-1994 (first entry) High molecular weight protein 2 (HMW2). Hww; high molecular weight protein; virus; vaccine; influenzaepitope; immunity; haemophilus influenzae. Haemophilus influenzae. W09319090-A. 30-SEP-1993. 16-MAR-1993, 93WO-US02166. 16-MAR-1992; 92GB-0005704. (INRM ) INSERM INST NAT SANTE & RECH MEDICALE. Barenkamp SJ; WPI; 1993-320683/40. High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties		7						
High molecular weight protein 2 (HMW2).  High molecular weight protein; virus; vaccine; influenza epitope; immunity; haemophilus influenzae.  Haemophilus influenzae.  W09319090-A.  30-SEP-1993.  16-MAR-1993; 93W0-US02166.  16-MAR-1992; 92GB-0005704.  (BABE/) BARENKAMP S J.  (INRM ) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ;  WPI; 1993-320683/40.  High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties		001-004-3	, 6 ; 4		(4)			
High molecular weight protein 2 (HMW2).  HMM; high molecular weight protein; virus; vaccine; influenza epitope; immunity; haemophilus influenzae.  Haemophilus influenzae.  W09319090-A.  30-SEP-1993.  16-MAR-1993; 93WO-US02166.  16-MAR-1992; 92GB-0005704.  (BARE/) BARENKAMP S J.  (INRM ) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ;  WPI; 1993-320683/40.  High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties		6-APR-199	(III	ں	À			
HWM; high molecular weight protein; virus; vaccine; influenza epitope; immunity; haemophilus influenzae.  Haemophilus influenzae.  W09319090-A.  30-SEP-1993.  16-MAR-1993; 93WO-US02166.  16-MAR-1992; 92GB-0005704.  (BARE/) BARENKAMP S J.  (INRM ) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ;  WPI; 1993-320683/40.  High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties			ar		otei	2 (HMW2		
HMW; high molecular weight process; vaccine; instructional process of the molecular weight process; instructional process; inmunity; haemophilus influenzae.  Haemophilus influenzae.  W09319090-A.  30-SEP-1993.  16-MAR-1992; 92GB-0005704.  (BARE/) BARENKAMP S J.  (INRW ) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ;  WPI; 1993-320683/40.  High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties								
Haemophilus influenzae. W09319090-A. 30-SEP-1993; 16-MAR-1993; 93WO-US02166. 16-MAR-1992; 92CB-0005704. (BARE/) BARENKAMP S J. (INNM ) INSERM INST NAT SANTE & RECH MEDICALE. BATENKAMP SJ. WPI: 1993-320683/40. N-PSDB; AAQ49507. High molecular weight surface proteins - of non-typeabl haemophilus which exhibit immunogenic properties		; high tope; i	olecula munity	ar weig ; haemo	jht pphi]	n; virus; fluenzae.	ccine;	
W09319090-A.  30-SEP-1993; 93WO-US02166.  16-MAR-1992; 92CB-0005704.  (BARE/) BARENKAMP S J.  (INNM ) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ; WPI: 1993-320683/40.  N-PSDB; AAQ49507.  High molecular weight surface proteins - of non-typeabl haemophilus which exhibit immunogenic properties		aemophilus	•+	enzae.				
W09319090-A.  30-SEP-1993.  16-MAR-1992; 92GB-0005704.  (BARE/) BARENKAMP S J.  (INRM ) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ;  WPI: 1993-320683/40.  N-PSDB; AAQ49507.  High molecular weight surface proteins - of non-typeabl haemophilus which exhibit immunogenic properties								
30-SEP-1993.  16-MAR-1993; 93WO-US02166.  16-MAR-1992; 92GB-0005704.  (BARE/) BARENKAMP S J.  (INRM ) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ;  WPI; 1993-320683/40.  N-PSDB; AAQ49507.  High molecular weight surface proteins - of non-typeabl haemophilus which exhibit immunogenic properties		319090-	:					
16-MAR-1993; 93WO-US02166. 16-MAR-1992; 92GB-0005704. (BARE/) BARENKAMP S J. (INRM ) INSERM INST NAT SANTE & RECH MEDICALE. BARENKAMP SJ; WPI: 1993-320683/40. N-PSDB; AAQ49507. High molecular weight surface proteins - of non-typeabl haemophilus which exhibit immunogenic properties		0-SEP-199						
16-MAR-1993; 93WO-USUZIDOD. 16-MAR-1992; 92GB-0005704. (BARE/) BARENKAMP S J. (INRM ) INSERM INST NAT SANTE & RECH MEDICALE. Barenkamp SJ; WPI: 1993-320683/40. N-PSDB; AAQ49507. High molecular weight surface proteins - of non-typeabl haemophilus which exhibit immunogenic properties	XX	1						
16-MAR-1992; 92GB-0005704.  (BARE) BARENKAMP S J.  (INRM ) INSERM INST NAT SANTE 6 RECH MEDICALE.  BATCHKAMP SJ;  WPI: 1993-320683/40.  N-PSDB; AAQ49507.  High molecular weight surface proteins - of non-typeabl haemophilus which exhibit immunogenic properties	PF 1	-MAR-199		MO-USO	4T0			
(BARE/) BARENKAMP S J.  (INRM ) INSERM INST NAT SANTE & RECH MEDICALE.  Barenkamp SJ;  WPI; 1993-320683/40.  N-PSDB; AAQ49507.  High molecular weight surface proteins - of non-typeabl haemophilus which exhibit immunogenic properties		6-MAR-199		3B-000	5704			
Barenkamp SJ; WPI; 1993-320683/40. N-PSDB; AAQ49507. High molecular weight surface proteins - of non-typeabl haemophilus which exhibit immunogenic properties	_	BARE/) INRM )	ENKAMP SERM IN	S F	SAN	E & RECH	ALE.	
WPI; 1993-320683/40. N-PSDB; AAQ49507. High molecular weight surface proteins - of non-typeabl haemophilus which exhibit immunogenic properties		arenkamp	3.7;					
High molecular weight surface proteins - of non-typeabl haemophilus which exhibit immunogenic properties		PI; 199 -PSDB;	)683/ )507.					
haemophilus which exhibit immunogenic proper		High molecu	lar	ight s	urfa	,	non-typea	ble
		naemophilus	whi	exhib	iti	Б	rties	

weiner with the control of the contr

The isolation and purification of the high molecular weight protein enables the identification of the major protective epitopes of the protein by conventional epitope mapping. These epitopes can then be synthesised using standard techniques and incorporated into fully synthetic or recombinant vaccines. Claim 4; Figure 4; 100pp; English.

ó:

121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180 61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDALINWKQFNIDQNEMVQFLQENN 120 61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120 181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240 241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300 301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420 421 SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 480 481 TTLINTIISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITS 540 0; Gaps 1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60 541 KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600 601 EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 660 661 SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720 721 KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780 781 NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840 781 NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840 Score 7389; DB 14; Length 1477; Pred. No. 0; 0; Mismatches 2; Indels 99.8**%**; 99.9**%**; datches 1475; Conservative Local Similarity 1477 AA; Sequence Duery Match 361 ó q δ 셤 δ g g ò ò 셤 ò g ò g δ a à q g õ ò à g qq ò δ g

```
SIIGGDIINKKGSLNITDSNNDAELQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 1020
                                                                                1021 DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                                                                                 1081 TENNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                 901 LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR 960
                                                                                                                                                                                                                 1141 VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                                                                                                                                                                                                             1201 KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA 1260
                                                                                                                                                                                                                                                                             GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                                                        1261 GSSITSTKGQVDLLAGNGSIAGSINAANVTLNTGTLTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                                                                                          1321 LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                                                                                                                                                                                                                                                                                                                                                                       1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                                                                                                                                                                     841 QNSSS$ITGNITIEKAANVILEANNAPNQONIRDRVIKLGSLLVNGSLSLIGENADIKGN 900
                                     Non-typeable Haemophilus; high molecular weight surface protein;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Non-typeable Haemophilus high mol.wt. surface protein HMW2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 hmw2A gene; immunogen; vaccine; otitis media.
                                                                                                                                                                                                                                                                                                                                                                                                                                                       1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   'note= "encoded by CGC"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /note= "encoded by TAT"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   'note= "encoded by ACT"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /note= "encoded by TTC"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /note= "encoded by GTT"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /note= "encoded by ATC"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       AAW30294 standard; Protein; 1477 AA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Haemophilus influenzae strain 12.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     14-APR-1998 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Misc-difference 34
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Misc-difference 36
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Misc-difference 37
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Misc-difference 38
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Misc-difference 39
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Misc-difference 40
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Misc-difference 35
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               AAW30294;
                                                                       196
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 RESULT 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              AAW30294
                                              q
                         δ
                                                                     οy
                                                                                            g
                                                                                                                   ò
                                                                                                                                         Dp
                                                                                                                                                                                       g
                                                                                                                                                                 δy
                                                                                                                                                                                                               ά
                                                                                                                                                                                                                                     рp
                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                   a
                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                          Ω
                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
```

/note= "encoded by TTT"

841 QNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGN 900 

ò

```
This protein comprises the high molecular weight surface protein

HWW2 (123 MDB) of non-typeable Haemophilus influenzae strain 12 that

has the immunological ability to protect against disease caused by a

non-typeable Haemophilus strain and is characterised by at least
one surface-exposed B-cell epitope that is recognised by monoclonal

c antibody AD6. The HWW2 amino acid sequence was deduced from the

is truncated, starting at residue 442 of the full-length gene

product. HWW1 (see AAW3029), HWW3 (see AAW30291) and HWW4 (see

C product. HWW1 (see AWW30292), HWW3 (see AWW30291) and HWW4 (see

C linked to an antigen, hapten or polysaccharide, and a synthetic

peptide of 6-150 amino acids corresponding to at least protective

epitope of HWW2 are also claimed. HWW proteins, conjugates and

c peptides can be used in vaccines, as immunogens for preparation of

antibodies and as antigens for detection of these antibodies.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     High molecular weight proteins of non-typeable Haemophilus influenzae - useful for vaccine production
                                                                                                                                                                                                                                                                                                                                                                                                  /note= "encoded by CGC"
                                                                                                                                                                                                                     'note= "encoded by AAA"
                                                                                                                                                                                                                                                 /note= "encoded by ACA"
                                                                                                                                                                                                                                                                              'note= "encoded by CCT"
                                                                                                                                                                                                                                                                                                           'note= "encoded by GAT"
                                                                                                                                                                                                                                                                                                                                         note= "encoded by ACA"
                                                                                                                                                                                                                                                                                                                                                                    'note= "encoded by GAA"
             /note= "encoded by AGG"
                                         /note= "encoded by TGT"
                                                                      'note= "encoded by AAC"
                                                                                                   'note= "encoded by TAT"
                                                                                                                             /note= "encoded by TCC"
                                                                                                                                                           note= "encoded by GAC"
                                                                                                                                                                                      'note= "encoded by AGC"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Claim 7; Page 73-78; 183pp; English.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     96US-0617697.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        97WO-US04707
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (BARE/) BARENKAMP S J.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          WPI; 1997-503038/46.
N-PSDB; AAT90995.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1477 AA;
                                                                                                                   Misc-difference 426
                                                                                                                                               Misc-difference 428
                                                                                                                                                                            Misc-difference 429
                                                                                                                                                                                                                                                                                              Misc-difference 444
                                                                                                                                                                                                                                                                                                                           Misc-difference 446
                                                                                                                                                                                                                                                                                                                                                        Misc-difference 448
                                                                                                                                                                                                                                                                                                                                                                                    Misc-difference 454
                                                                                                                                                                                                                                     Misc-difference 435
                                                                                                                                                                                                                                                                  Misc-difference 442
                                                                                      Misc-difference 424
                                                                                                                                                                                                         Misc-difference 434
Misc-difference 41
                             Misc-difference 42
                                                          Misc-difference 43
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        01-APR-1997;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     01-APR-1996;
                                                                                                                                                                                                                                                                                                                                                                                                                                 WO9736914-A1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Sequence
```

0; Gaps

99.0%; Score 7336; DB 18; Length 1477; 99.2%; Pred. No. 0;

Pred. No. 0; 1; Mismatches 11; Indels

Best\_Local Similarity 99.2 Matches 1465; Conservative

ò

Query Match

1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60

```
1021 DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1081 TENNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    961 SIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 1020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ONSSSSITGNITIEKAANVTLEANNAPNOONIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              901 LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR 960
                                                                                                                                                                                                                                                                                                                SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 480
                                                                                                                                                                                                                                                                                                                                                                     601 EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           661 SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      661 SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 721 KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840
                                       61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                            241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                             61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                               121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                  181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                       241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                             301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                  361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSRYVTIFRCNHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                   421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           781
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    781
                                                                                                                                                                                                                                                                                                                                                          421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ΩD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ōλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Ωý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ολ
                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                             Q
                                                                                                                                                                                                                                                                       ΩD
                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                             Op
                                                                                                                                                                                                                                                                                                                                                        QΥ
                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                           οy
                                                                                 δλ
                                                                                                          pp
                                                                                                                                    ò
                                                                                                                                                              qq
                                                                                                                                                                                         οy
                            ŏ
```

```
HMW protein; hmw gene; hmwA1; high molecular weight; non-typeable Haemophilus influenzae; NTH1; non-encapsulated; recombinant production; Escherichia coli; antibacterial; vaccine; human disease; otitis media; epiglottitis; pneumonia; tracheobronchitis;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    influenzae high molecular weight (HMW) proteins in Escherichia coli. The expression construct used to effect recombinant expression comprises a promoter functional in E. coli (e.g., the T7 promoter) operably linked to a modified humABC operon from a non-typeable (non-encapsulated) Hifluenzae (NTHI). Most HMW-expressing NTHI strains contain two hum gene clusters termed humVaBC and humVaBBC. Each humABC operon comprises humA,
                 1141 VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATGDLFTKSGSKIEA 1200
                                                                  1201 KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA 1260
                                                                                            1141 VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                                                                                           1261 GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                               LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                                                                                                                                                                                                                                     1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERFTLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                                      1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Nucleic acid molecule for producing recombinant high molecular weight
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       The invention relates to the recombinant production of Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              proteins of Haemophilus which are used as a vaccine to provide protection against Haemophilus induced diseases in humans
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Haemophilus influenzae strain 12 HMW2A protein, SEQ ID NO:71.
                                                                                                                                                                                                                                                                                                                                                             1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                 Example 16; Fig 29A-N; 307pp; English.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         AAB01848 standard; Protein; 1477 AA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Haemophilus influenzae strain 12.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Loosmore SM, Yang Y, Klein MH;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               98US-0206942.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                98US-0167568
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          99WO-CA00938
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                11-SEP-2000 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (CONN-) CONNAUGHT LAB LTD.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               detection; diagnosis.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2000-303789/26.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           N-PSDB; AAA52197
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    WO200020609-A2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          07-OCT-1999;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          07-0CT-1998;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               08-DEC-1998;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     13-APR-2000.
ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                        g
                                                                                                                                                                              g
                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                           ö
                                                                                                                                                                                                                δ
                                                                                                                                                                                                                                                                                      ò
```

cc and the huwb and huwc genes. The huwb genes encode the structural HWWA proteins cand the huwb and huwc genes encode accessory proteins which are responsible for post-translational processing and secretion of the HWWA proteins. The modified huwbab operon used in the expression construct of mature HWWA. The invention also discloses humb genes (AAASI198).

CC mature HWWA. The invention also discloses humb genes (AAASI198).

CC mature HWWA. The invention also discloses humb genes (AAASI198).

CC mature HWWA. The production of recombinant H. influenzae coverors are used for the production of recombinant H. influenzae HWW proteins which can be used as vaccines to mediate a humoral or cell-mediated immune response to provide protection against diseases in humans caused by H. influenzae (e.g., offitis media, epiglottitis, pneumonia and tracheobronchitis). The HWW proteins are also useful as antigens in immunoassays for detecting antibodies against Haemophilus, CM HWW proteins can be used to isolate and clone hww genes from other control of the production of the production can be used to isolate and clone hww genes from other control of present sequence represents an HWWA protein from a non-typeable strain of H. influenzae.

Sequence 1477 AA;  ö

```
181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                          61 9IPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                     121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                       301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                               421 SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            481 TTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITS 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   541 KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    601 EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 660
                                 Gaps
                                                       1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                      661 SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF
                                ö
98.0%; Score 7261; DB 21; Length 1477; 98.4%; Pred. No. 0;
                                Indels
                              20;
                             3; Mismatches
               Best Local Similarity 98.4
Matches 1454; Conservative
Query Match
                                                                                  g
                                                                                                              ŏ
                                                                                                                                        a
                                                                                                                                                                   ò
                                                                                                                                                                                             QQ
                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                              δλ
                                                                                                                                                                                                                                                                                                          Op
                                                                                                                                                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                              δy
                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                                                                                     ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      q
```

Dp Qγ a οy Ω δ qq Óγ

```
601
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                         pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ōλ
DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                                                                                                                                                                                                                                                         1021 DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                                                                                                                                                                                                                                                                                            1081 TFUNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                                                                                                                                                                                            VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                                                                                                                                                                                                                                                                                                                                                                   1141 VNITASEKVITTAGSTINATNGKASITTKTGDISGTISGNIVSVSATGDLTTKSGSKIEA 1200
                                                                                                                                                                                                                                                                                                                                                                                                                                                        KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       SIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 1020
                                                                                                                                                                                                                                                            SIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 1020
                                                                                                                                                                                        LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR 960
           721 KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                                                NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840
                                                                                                                     QNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        High molecular weight protein; HMW2; protective vaccine; otitis; sinusitis; bronchitis; Hib; ss.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Haemophilus high molecular weight protein HMW2.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              AAR63506 standard; Protein; 1477 AA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   25-JUN-1995 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         29-SEP-1994.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               WO9421290-A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         AAR63506;
                                                                                                                                                                                                                                                            196
                                                                                                                                                                                                     901
                                                                                                                                                                                                                                961
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1261
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1321
                                                                                                                                                                          901
                                                                                                                                                                                                                                                                                                                                                                                                                                                        1201
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RESULT 4
```

g

g

ò

Ω

δ

Q ò ΩD ò Db Ω ΩD δλ

ò

ŏ

```
61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               12.1 NSAVENRVISNOISOLKGILDSNGOVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              421 SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            481 TTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITS 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        541 KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 The HMW2 protein encoded by this sequence is useful in a vaccine to protect against disease caused by non-typeable Haemophilus which are not controlled by H. influenzae type b (Hib) vaccines. The encoded protein can also be used as a carrier for protective Hib polysaccharide (in a conjugte vaccin against meningitis) or for other antigens, haptens, etc.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         DB 15; Length 1477;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      21; Indels
                                                                                                                                                                                                                                                                                     New immunogenic high mol. wt. proteins of non typeable Haemophilus - useful in protective vaccines
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       97.9%; Score 7252; DI
98.3%; Pred. No. 0;
tive 4; Mismatches
                                                                                                                                                                                                                                                                                                                                                          Claim 3; Page 36; 127pp; English.
  94WO-US02550
                                                 93US-0038682.
                                                                                                                                                                Barenkamp SJ, St GEME JW;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Conservative
                                                                                              (BARE/) BARENKAMP S J. (SGEM/) ST GEME J W.
                                                                                                                                                                                                             WPI; 1994-316665/39.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1477 AA;
                                                                                                                                                                                                                                        O-PSDB; 072294
15-MAR-1994;
                                               16-MAR-1993;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Matches 1452;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         601
```

ö

```
TFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                                1080
                                                                                                                                                                                                                                                 1080
                                                                                                                                                                                                                                                                         VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                                                                                                                                                                                                                                                             GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLV1NAKDAK 1320
                                                                                                                                                                                                                                                                                                                                                                                      LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                                                                                                                                                                                                                                                                                                                                                                                                                            1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                              096
                                                                         NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840
                                                                                                840
                                                                                                                  900
                                                                                                                                   900
                                                                                                                                                                        960
SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF
                                                                                   QNSSSSITGNITIEKAANVTLEANNAPNQONIRDRVIKLGSLLVNGSLSLTGENADIKGN
                                                                                                                       LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR
                                                                                                                                                            SIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE
                                                                                                                                                                                                                                     KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTEA
                                                                                                                                                                                                                           DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                    721
                                                                                                                                                 901
                                                                                                                                                                                                                                                               1081
                                                                                                                                                                                                                                                                                 1081
                                                                                                                                                                                                                                                                                                    1141
                                                                                                                                                                                                                                                                                                                      1141
                                                                                                                                                                                                                                                                                                                                                          1201
                                                                         781
                                                                                                             841
                                                                                                                                                                    901
                                                                                                                                                                                       961
                                                                                                                                                                                                         196
                                                                                                                                                                                                                           1021
                                                                                                                                                                                                                                            1021
                                                                                                                                                                                                                                                                                                                                        1201
                                                                                                                                                                                                                                                                                                                                                                            1261
                                                                                                                                                                                                                                                                                                                                                                                              1261
                                                                                                                                                                                                                                                                                                                                                                                                                                   1321
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1441
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1441
                                                                                                                                                                                                                                                                                                                                                                                                                 1321
                g
                                    ð
                                                     q
                                                                        ò
                                                                                          g
                                                                                                             ò
                                                                                                                             g
                                                                                                                                                ŏ
                                                                                                                                                                 g
                                                                                                                                                                                      ŏ
                                                                                                                                                                                                     g
                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                              ö
                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                        οy
                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                      ğ
```

```
RESULT 5
AAR41728
ID AAR41728 standard; Protein; 1477 AA.
XX
AC AAR41728;
XX
DT 26-APR-1994 (first entry)
XX
DE High molecular weight protein 2 (HMW2).
XX
W HMW; high molecular weight protein; virus; vaccine; influenza;
XX
XX
DE High molecular weight protein; virus; vaccine; influenza;
XX
XX
HMW; high molecular weight protein; virus; vaccine; influenza;
XX
XX
SE Haemophilus influenzae.
```

KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600

541

```
480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             540
                                                                                                                                                                                                                                               The isolation and purification of the high molecular weight protein enables the identification of the major protective epitopes of the protein by conventional epitope mapping. These epitopes can then be synthesised using standard techniques and incorporated into fully synthetic or recombinant vaccines. This sequence is claimed to be the same as that given in AAR41724 (High molecular weight protein 2) although it does differ slightly.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       540
                                                                                                                                                                                                                                                                                                                                                                                                 Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                 1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                              9
                                                                                                                                                                                                                                                                                                                                                                                                                               NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        TTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ö
                                                                                                                                                                                                                                                                                                                                                                        Length 1477;
                                                                                                                                                                                        High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties
                                                                                                                                                                                                                                                                                                                                                                                                Indels
                                                                                                                                                                                                                                                                                                                                                                      Query Match
97.1%; Score 7193; DB 14;
Best Local Similarity 97.8%; Pred. No. 0;
Matches 1444; Conservative 5; Mismatches 28;
                                                                                             (BARE/) BARENKAMP S J.
(INRM ) INSERM INST NAT SANTE & RECH MEDICALE.
                                                                                                                                                                                                                           Claim 4; Figure 4; 100pp; English.
                                                93WO-US02166
                                                                       92GB-0005704
                                                                                                                                                     WPI; 1993-320683/40.
                                                                                                                                                                                                                                                                                                                                              1477 AA;
                                                                                                                                                                   N-PSDB; AAQ49509
                                                                                                                                Barenkamp SJ;
                                               16-MAR-1993;
                                                                       16-MAR-1992;
WO9319090-A.
                        30-SEP-1993
                                                                                                                                                                                                                                                                                                                                               Sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               121
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 61
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       61
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       481
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             481
 g
                                                                                                                                                                                                                                                                                                                                                                                                                     ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ά
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ð
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
```

ö

```
QΩ
ŏλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                                                     1201 KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA 1260
                                                                                                                                                                                                                                                                                                                                                                         1261 GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                                                                                                                                            1321 LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                                                                                                                                                                                                                                                                                                                                                                                                                                             1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                         1141 VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                                                                                                                                                                                                                                            1081 TFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                                                                                           1021 DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                                                                                                                                                 901 LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR 960
                                                                                                                                ONSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
 541 KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600
                           661 SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720
                                                              KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                                                                               NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840
                   601 EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Non-typeable Haemophilus high mol.wt. surface protein HMW4.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1441 BFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  AAW30292 standard; Protein; 1601 AA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    14-APR-1998
                                                                                      721
                                                                                                                        781
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Dp
                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                οy
                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                  q
                                                                                                                                                                                                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                         ŏ
                                                                                                                                                                                                          g
                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                           pp
                                                                                                                                                                                                                                                                                                                            οy
                                                                                                                       ò
                                                                                                                                       g
                                                                                                                                                        ò
                                                                                                                                                                         a
                                                     ŏ
                                                                     g
                                                                                      ò
                                                                                                       g
```

```
61 SIPOSVLASGLOGMSVVHGTATMQVDGNKTTIRNSVNAIINWKQFNIDQNEMVQFLQESS 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               121 NSAVENRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    This protein comprises the high molecular weight surface protein HWW4 (123 kDa) of non-typeable Haemophilus influenzae strain 5 that has the immunological ability to protect against disease caused by a non-typeable Haemophilus strain and is characterised by at least one surface:exposed B-cell epitope that is recognised by at least antibody ADG. The HWM4 amino acid sequence was deduced from an isolated hmw4 gene (see AAM79093). HWM1 (see AAM30293), HWM2 (see AAM30293)
Non-typeable Haemophilus; high molecular weight surface protein; HMW4; immunogen; vaccine; otitis media.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Ouery Match 71.3%; Score 5284; DB 18; Length 1601; Best Local Similarity 68.4%; Pred. No. 3.4e-243; Matches 1100; Conservative 136; Mismatches 231; Indels 142;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       High molecular weight proteins of non-typeable Haemophilus influenzae – useful for vaccine production
                                                                                                                                                                                                                                                                                                                                                                                                                                                    /note= "encoded by AAT"
                                                                                                                                                                                                                                                                                                                                           /note= "encoded by TCT"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Claim 1; Page 97-102; 183pp; English.
                                                                                                                                                                                                                                                          Location/Qualifiers
                                                                                                                                                       Haemophilus influenzae strain 5.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               96US-0617697.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            97WO-US04707
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (BARE/) BARENKAMP S J.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            WPI; 1997-503038/46.
N-PSDB; AAT90993.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1601 AA;
                                                                                                                                                                                                                                                                                                                                                                                                     Misc-difference 400
                                                                                                                                                                                                                                                                                                        Misc-difference 372
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            01-APR-1997;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               01-APR-1996;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  WO9736914-A1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     09-OCT-1997.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Query Match
```

	LEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 42 	VDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 48	ANITASRKLTVNSSINIGSNSHLILHSKGQRGGVQLDGDITS 54	/NITLDQGFLNITAA-SVAFEGGNNKARDANAKTVAGGTT:		SLNGTGKELNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTS 65.	STGANFTFIXISSNSKGLTTOYRSSAGVNFNGVNGNMSFNLKEG	NTVQKFTFIKFVDSGSNSQDLRSSRRSFAGVHFNGIGGKTNFNIGANA 71	<u>G</u>	DDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGG 83	NAFETKKDLTINATGSNFSLKQTKDSFYNEYSKHAINSSHNLTILGG 83:	INCOLLINGARY LEGANNARY NOON TRANSFERENCES SOLUTION TO THE SOLUTION OF THE SOLUTION OF THE SOLUTION SOL	TEKGKTRDILNITGNETNNGTABINITGGVVKL-GNVTNDGDLNITT 95	IINKKGSLNITDSNNDAEIOIGGNISOKFGNITITGGGLNITIT 955		ATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNS 1073	DSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNK 113	SKISTDGHUVILNSEVKTSNGSSNAGNDNSTGLIISAKDVT	AGNVTTKEGTTINATT	SITT TARMETER TO SECURE THE SECURE TO SECURE THE SECURE		GEANVTSATG121		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	INSVTISSQSGDIEGTISGNTVNVTASTGDLTIGNSAKVEAKNGA	SSITSTK
	GKNGIQLAKKTSLEKGSTINV 	SGHDLFIKDNAIVDAKEWLLD          :	TTLINTTISNYLKNAWTMNITA	-KGGNLTIYSGGWVDVHKNITL	:       :	LNGTGKGL :	DSHWNVSALNLETGANFTFIK	DSIWNVSSETENTVOKFTFIK VNFKLKPNENMNTSKPLPIRE	 LFKLKPNAATDPKKELPITE	AFKINKDL	FSIISHNKNSNAFEIKK	GNINIT	FKGKTRD    :   FKGEASD	KRNQRSIIGGDIINKKGSL	::    :    :   GTQKTIINGNIINEKGDE	SNANLTIK      : ENANLTIQ	SKISADG	ADAKKVTFDKVKDSKISTDG	KEGT	AGSTINATNGKASITTKTGDIS		TTKSGSKIEAKSGEANVTSATG	TTTAGSTISATTGNANITTKTG	TIG	GKLTSTVGSTINGTNSVTTSSQ	LTATGNTLTTEAGSSITSTKG
301	361	421	481	4	536	599	in i	717	ਜ	775			895	954	9	1014	74 (	75	1134 [	1152 1	92	1190 1	52	213	312	1248 T
В	QY	99 Dp	oy G	λο	QQ	Qy Dp	ò à	g &	qq	δy dg	3 8	2 g	Oy Op	ΟÝ	qq	Qy Dp	δy	qq	Qy Db	οy	qq	٥y	qq	δο	ga	οy

```
Mature HMW protein; hmw gene; hmwAl; hmwA2; high molecular weight; non-typeable Haemophilus influenzae; NTH1; non-encapsulated; recombinant production; Escherichia coli; antibacterial; vaccine; human disease; otitis media; epiglottitis; pneumonia; tracheobronchitis;
1372 TLTAESGKLTTQTGSSITSSNGQTTLTAKDSSIAGNINAANVTLNTGTLTTTGDSKINA 1431
                1308 TSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIIS 1367
                          1368 KDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRF 1427
                                                           Haemophilus influenzae strain 12 mature HMW2A protein, SEQ ID NO:73.
                                                                                          1428 VEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                         AAB01849 standard; Protein; 1036 AA.
                                                                                                                                                                          11-SEP-2000 (first entry)
                                                                                                                                                                                                                                            detection; diagnosis.
                                                                                                                                                           AAB01849;
                                                                                                                          RESULT 7
AAB01849
                 ò
                                 q
                                                                                                                                                          οy
                                                                  q
                                                                                  δ
                                                                                                 qq
```

Haemophilus influenzae strain 12. 98US-0167568. 98US-0206942. 99WO-CA00938. WO200020609-A2. 07-OCT-1999; 07-0CT-1998; 08-DEC-1998; 13-APR-2000.

(CONN-) CONNAUGHT LAB LTD.

Loosmore SM, Yang Y, Klein MH;

WPI; 2000-303789/26. N-PSDB; AAA52198 Nucleic acid molecule for producing recombinant high molecular weight proteins of Haemophilus which are used as a vaccine to provide protection against Haemophilus induced diseases in humans.

Claim 8; Fig 29E-N; 307pp; English.

The invention relates to the recombinant production of Haemophilus confluenzae high molecular weight (HWW) proteins in Escherichia coli. The expression construct used to effect recombinant expression comprises a promoter functional in E. coli (e.g., the 77 promoter) operably linked to a modified hmwABC operon from a non-typeable (non-encapsulated) H. cifiuenzae (NTHi). Most HWW-expressing NTHI strains contain two hmw gene in the new genes. The hmwA genes encode accessory proteins which are caponsible for post-translational processing and secretion of the HWWA copers encode accessory proteins which are responsible for post-translational processing and secretion of the HWWA copers encode accessory proteins which are the HWWA the invention contains an A gene modified such that it encodes only the mature HWWA. The invention also discloses hmwA genes (AAA52175-A52198) cand HWWA proteins (AAB01824-B01849) from the non-typeable H. influenzae coperations of the production of recombinant H. influenzae HWW copers are used for the production of recombinant H. influenzae HWW copers which can be used as vaccines to mediate a humoral or cell-mediated immune response to provide protection against diseases in

```
ö
humans caused by H. influenzae (e.g., otitis media, epiglottitis, pneumonia and tracheobronchitis). The HWW proteins are also useful as antigens in immunoassays for detecting antibodies against Haemophilus, HWW proteins and/or HWW peptides. The nucleotide sequences encoding the HWW proteins can be used to isolate and clone hww genes from other non-typeable strains of Haemophilus via hybridisation reactions. The present sequence represents a mature HWWA protein from a non-typeable strain of H. influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNT 1222
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1223 VNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAG 1282
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1283 SINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGS 1342
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       AEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLT 1042
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            .043 EDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSK 1102
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    VKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKTVNITASEKVTTTAGSTINATNG 1162
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      662 VKTSSSNGGRESNSDNDFGLTITAKNVEVNKDITSLKTVNITASEKVFTFAGSTINATNG 721
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      782 VNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAG 841
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        923 FTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNND 982
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   623 SSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHDSHWNVSALNLETGANFTFIKYI 682
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      683 SSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFLANI 742
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              743 TATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATN 802
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   SNFSLROTKDDFYDGYARNAINSTYNISILGGNVTLGGONSSSSITGNITIEKAANVTLE 862
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         863 ANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGN 922
                                                                                                                                                                                                                                                                                                                                        443 DNVSINAEDPLENNTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITA 502
                                                                                                                                                                                                                                                                                                                                                                                                                                   503 SRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITSKGGNLTIYSGGWVDVHKNITLD 562
                                                                                                                                                                                                                                                                                                                                                                                                                                                        62 SRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDITSKGGNLTIYSGGWVDVHKNITLD 121
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           563 QGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLNII 622
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                242 SSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFLANI 301
                                                                                                                                                                                                                                                                                               0; Gaps
                                                                                                                                                                                                                                                                                                                                                                  2 DDVT1EAEDPLKNNTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITA 61
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        182 SSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHDSHWNVSALNLETGANFTFIKYI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      69.7%; Score 5164; DB 21; Length 1036; 99.5%; Pred. No. 1e-237; tive 2; Mismatches 3; Indels 0;
                                                                                                                                                                                                                                                                                               Conservative
                                                                                                                                                                                                            1036 AA;
                                                                                                                                                                                                                                                                          Similarity
                                                                                                                                                                                                                                                                               Best Local Sim
Matches 1030;
                                                                                                                                                                                                            Sequence
                                                                                                                                                                                                                                                        Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1163
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        602
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1103
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       οý
                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          P
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     d
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Q
```

```
20;
                                                                                     1343 VTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRV 1402
1902 VTAATSSSVNITGDLNTVNGLNIISKOGRNTVRLRGKEIEVKYIQPGVASVEEVLEAKRV 961
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       121 NSAVENRYTSNQISQLKGILDSNGQVELINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         61 SIPQSVLASGLQCMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            842 SINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGS 901
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                The isolation and purification of the high molecular weight protein enables the identification of the major protective epitopes of the protein by conventional epitope mapping. These epitopes can then be synthesised using standard techniques and incorporated into fully synthetic or recombinant vaccines.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               67.1%; Score 4967; DB 14; Length 1536; 67.3%; Pred. No. 3.9e-228; tive 146; Mismatches 264; Indels 98;
                                                                                                                                                                                                                                                                                                                                                                                       HMW; high molecular weight protein; virus; vaccine; influenza;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (BARE/) BARENKAMP S J.
(INRM ) INSERM INST NAT SANTE & RECH MEDICALE.
                                                                                                                                                                                                                                                                                                                                                                                                   epitope; immunity; haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                       High molecular weight protein 1 (HMW1).
                                                                                                                                                                                                                                                             AAR41723 standard; Protein; 1536 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Claim 3; Figure 2; 100pp; English.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ilarity 67.3%; Pr
Conservative 146;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          92GB-0005704.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             93WO-US02166.
                                                                                                                                                                                                                                                                                                                            26-APR-1994 (first entry)
                                                                                                                                                                        1022 NGARVCTNVADDGQP 1036
                                                                                                                                                      1463 NGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                    Haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   WPI; 1993-320683/40.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1536 AA;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                N-PSDB; AAQ49506
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               30-SEP-1993.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             16-MAR-1993;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           16-MAR-1992;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                WO9319090-A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Matches 1047;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Sednence
                                                                                                                                                                                                                                                                                              AAR41723;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Local
                                                                                                                                                                                                                                   RESULT 8
                                                                                                                                                                                                                                             AAR41723
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δ
                                                                                                                                                                                                                                                                                              δ
                                                           Dp
                                                                                            ŏ
                                                                                                                       qq
                                                                                                                                                       ò
```

25

Tue Mar

Page 10

```
1361
VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1241
              1481
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         The isolation and purification of the high molecular weight protein enables the identification of the major protective epitopes of the protein by conventional epitope mapping. These epitopes can then be synthesised using standard techniques and incorporated into fully synthetic or recombinant vaccines.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Gaps
                                                1242 ATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTGTLTTVA
                                                                                                 1302 GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN
                                                                                                                1362 GLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG
                                                                                                                                                               1422 VSAVREVEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Indels 142;
                                                                                                                                                                                                                                                                                                                                                                                        HMW; high molecular weight protein; virus; vaccine; influenza; epitope; immunity; haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Length 1529;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          High molecular weight surface proteins – of non-typeable haemophilus which exhibit immunogenic properties
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Query Match
66.9%; Score 4957; DB 14;
Best Local Similarity 67.2%; Pred. No. 1.2e-227;
Matches 1033; Conservative 135; Mismatches 227;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         J.
NAT SANTE & RECH MEDICALE.
                                                                                                                                                                                                                                                                                                                                                                  High molecular weight protein 4 (HMW4).
                                                                                                                                                                                                                                                                                             AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Claim 6; Figure 10; 100pp; English.
                                                                                                                                                                                                                                                                                        AAR41732 standard; Protein; 1529
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      . 93WO-US02166.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                92GB-0005704.
                                                                                                                                                                                                                                                                                                                                          (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                              Haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (INRM ) INSERM INST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     WPI; 1993-320683/40.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   N-PSDB; AAQ49511
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       16-MAR-1993;
                                                                                                                                                                                                                                                                                                                                          26-APR-1994
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               16-MAR-1992;
                                                                                                                                                                                                                                                                                                                                                                                                                                                     WO9319090-A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               30-SEP-1993
                                                                                                                                                                                                                                                                                                                 AAR41732;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Query Match
1182
                                                                                                                                                                                                                                                                 RESULT 9
                                                                                                                                                                                                                                                                             AAR41732
                       qq
                                                                                                                                                                                                                                                                                                                 à
                                                á
                                                                       g
                                                                                                 ŏ
                                                                                                                          q
                                                                                                                                                                          Dp
                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  QD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δŏ
```

Qy Db	133	ISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIKARNFTFEQTKDK 1 	192 120
QY Db	193	ALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGGKITISDIINPTITYS :	252 180
QY Dp	253	IAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIVLSAKEGEAEIGG :	312 240
QY Db	313	VISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGEGKNGIQLAKKTS	372
Qy Db	373	LEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVETSGHDLFIKDNAI -	432
Oy Db	433	VDAKEWLLDFDWVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYL	492
Qy	493	KNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITS-RGGNLIIYSGG :	551 475
Qy Db	552	WVDVHKNITLDQGFLNITAA-SVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNV 	610 535
Qy Db	611 536	SLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHDSHWNVSALNL  :         :	670 595
Qy Db.	671 596	ETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENN	728 655
QY Db	729	NTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTLNSHVRG:	786
Qy	787	DDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGGQNSSSS:   :	846
Qy Db	847	ITGNITIEKAANVTLEANNAPNQONIRDRVIKLGSLLVNGSLSLTGENADIKGNLTISES	906 835
Qy	907	ATFKGKTRDTLNITGNFTNNGTAEINITQGVVKL-GNVTNDGDLNITTHAKRNQRSIIGG :    :	965 895
Qy	966	IZ :: IX	1025 955
Qy Db	1026 956	ATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGAEAKTYTFNNV 	1085
Qy	1086	KDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDÍTSLKTVNI 	1143
Qy Db	1144	AAGNVTTKEGTTINATTGSVEV	1163 1131
1	;		

```
1380 EIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQ 1439
                                                                                                                                                                                                                                                      1216 ------GTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTE 1259
                                                                                                             1260 AGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDA 1319
                                                                                                                                                        1320 KLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGK 1379
               1202 SGEANVTSATG-----TIG--- 1215
1164 ASITTKTGDISG-----TISGNTVSVS------ATVD---LTTKSGSKIEAK 1201
                                                                     1192 TGNANITTKTGDINGKVESSSGSVTLVATGATLAVGNISGNTVTITADSGKLTSTVGSTI 1251
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              This protein comprises the high molecular weight surface protein
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Non-typeable Haemophilus; high molecular weight surface protein; HMWI; hmwlA gene; immunogen; vaccine; otitis media.
                                                                                                                                                                                                                                                                                                                                                                                                                                                 Non-typeable Haemophilus high mol.wt. surface protein HMW1.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   High molecular weight proteins of non-typeable Haemophilus influenzae - useful for vaccine production
                                                                                                                                                                                                                                                                                                        1492 NEFTTRPSSQVTISEGKACFSSGNGARVCTNVADDGQ 1528
                                                                                                                                                                                                                                                                                         1440 NEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /note= "encoded by GAT"
Misc-difference 363
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           'note= "encoded by CTA"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Claim 7; Page 66-70; 183pp; English.
                                                                                                                                                                                                                                                                                                                                                                             AAW30293 standard; Protein; 1536 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Haemophilus influenzae strain 12.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             N-PSDB; AAT90994 and AAT90996.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          96US-0617697.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  97WO-US04707.
                                                                                                                                                                                                                                                                                                                                                                                                                            14-APR-1998 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (BARE/) BARENKAMP S J.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 WPI; 1997-503038/46.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Misc-difference 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   WO9736914-A1.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  01-APR-1997;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          01-APR-1996;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           09-OCT-1997.
                                                                                                                                                                                                                                                                                                                                                                                                    AAW30293;
                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                          òγ
                                                                                                                                                                                                                                                                                                                qq
                                                                        q
                                                                                                                     QΩ
                                                                                                                                             Qy
                                                                                                                                                                     qq
                                                                                                                                                                                            òγ
                                                                                                                                                                                                                   Д
                                                                                                                                                                                                                                            ò
                                                  òγ
                                                                                               δ
```

HMM1 (125 kDa) of non-typeable Haemophilus influenzae strain 12 that has the immunological ability to protect against disease caused by a non-typeable Haemophilus strain and is characterised by at least constraints and is characterised by at least at least constraints by monoclonal antibody AD6. The HMM1 amino acid sequence was deduced from the antibody AD6. The HMM1 amino acid sequence was deduced from the hmm1 gene sequence (see AM790994 and AM790996). The expressed protein is truncated, starting at residue 442 of the full-length gene product. HMM2 (see AM30292) have also been identified. A conjugate comprising HMM1 captide of 6-150 amino acids corresponding to at least protective epitope of HMM1 are also claimed. HMW proteins, conjugates and epitope of HMM1 are also claimed. HMW proteins, conjugates and epitope of HMM1 are also claimed. HMW proteins, conjugates and as antigens for detection of these antibodies. 8\$88888888888888888

1536 AA; Sequence

20; NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180 360 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120 240 361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFALVWGDIALIDGNINAQGSGDIAKTGGFVET 420 SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTG-EASDPKKNSEL 479 Gaps NTS-YWQTSHDSHWNVSALNLETGANFTF-IKYISSNSKGLTTQYRSSAGVNFNGVNGNM 708 1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60 SFNLKEGAKVNFKLKPNENMNTSKPLP-IRFLANITATGGGSVFFDIYANHSG---RGAE 764 :||::||:||:|
707 TFNVERNARVNFDIKAPIGINKXSSLNYASFNGNISVSGGGSVDFTLLASSSNVQTPGVV 766 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV KTTLINTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDIT ----SKGGNLTIYSGGWVDVHKNITLD-QGFLNITA-ASVAFEGGNNKARDAANAKIVAQ GTVTITGEGKDFRANNVSLNGTGKGLNIISSVNN---LTHNLSGTINISGNITINQTTRK | | | : ::||::||: | : | ::| | : | ::| | : | ::| | : | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| | ::| 98; Length 1536; Indels Query Match 66.9%; Score 4956; DB 18; Best Local Similarity 67.3%; Pred. No. 1.3e-227; Matches 1046; Conservative 146; Mismatches 265; 61 121 61 121 181 181 241 301 301 421 480 479 538 591 421 594 651 709 ò q ò g δ g δ q g οy g ò ŏ g ò g g g ò οy g à ò a ð qq

1005 INITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLT 1064 1182 VTLTATEGALAVSNISGNTVTVTANSGALTTLAGSTIKGTESVTTSSQSGDIGGTISGGT 1241 VSVSATVDLTTKSGSKIEAKSGEANVTSATGTLGGTISGNTVNVTANAGDLTVGNGAEIN 1241 1302 GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN 1361 ATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVA 1301 LKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAIN 824 INSKYFNVSTGSSLRFKTSGSTKTGFSIEKDLTLNATGGNITLLQVEGT--DGMIGKGIV 824 STYNISILGGNVTLGGQNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLV NGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVT NDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDK 1003 INTERQITIKAGVDGENSDSDATNNANLTIKTKELKLTQDLNISGFNKAEITAKDGSDLT 1065 IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTI 1063 IGNTNSAD-GTNAKKVTFNQVKDSKISADGHKVTLHSKVETSGSNNNTEHSSDNNAGLTI THE STISSITS OF THE STISSING AND THE STI GLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG 1422 VSAVRFVEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476 High molecular weight protein; HMW1; protective vaccine; otitis; TAKNVEVNKDITSLKTVNITA-SEKVTTTAGSTINATNGKASITTKT---Haemophilus high molecular weight protein HMW1. AA. AAR63505 standard; Protein; 1536 94WO-US02550 (first entry) sinusitis; bronchitis; 15-MAR-1994; 25-JUN-1995 29-SEP-1994 Haemophilus AAR63505; 885 765 825 945 167 1125 1171 1182 1302 1362 ( 1242 RESULT 11 AAR63505 q ŏ d δ g δy g q ŏ δ Q pp ò δ q ò qq ò q ŏ qq qq ò 

```
g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Qγ
                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                             QQ
                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Q
                                                              δ
                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     20;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDDIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 181 ARNFTFEOTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SCHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTG-EASDPKKNSEL 479
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     480 KTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDIT 539
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             540 ----SKGGNLTIYSGGWVDVHKNITLD-QGFLNITA-ASVAFEGGNNKARDAANAKIVAQ 593
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      538 TGDDTRGANLTIYSGGWVDVHKNISLGAQGNINITAKQDIAFEKGSNQV-----ITGQ 590
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     594 GTVT1TGEGKDFRANNVSLNGTGKGLNIISSVNN---LTHNLSGTINISGNITINQTTRK 650
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 KTTLTNTTLESILKKGTFVNITANQRIYVNSSINL-SNGSLTLWSEGRSGGVEINNDIT 537
                                                                                                                                                                                                                                                                                                                            The HWM1 protein encoded by this sequence is useful in a vaccine to protect against disease caused by non-typeable Haemophilus which are not controlled by H. influenzae type b (Hib) vaccines. The encoded protein can also be used as a carrier for protective Hib polysaccharide (in a conjugate vaccin against meningitis) or for other antigens, haptens, etc.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     98; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1 MNKLYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Duery Match 66.7%; Score 4943; DB 15; Length 1536; Best Local Similarity 67.1%; Pred. No. 5.4e-227; Matches 1043; Consery 417; Mismatches 267; Indels 98;
                                                                                                                                                                                                                       New immunogenic high mol. wt. proteins of non typeable Haemophilus - useful in protective vaccines
                                                                                                                                                                                                                                                                                          Claim 2; Page 31; 127pp; English.
93US-0038682.
                                                                                                          Barenkamp SJ, St GEME JW;
                                         (BARE/) BARENKAMP S J. (SGEM/) ST GEME J W.
                                                                                                                                                      WPI; 1994-316665/39.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1536 AA;
                                                                                                                                                                                Q-PSDB; Q72293
16-MAR-1993;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
```

qq ŏ Dp δ Dp ò g δ

οy

qq

g δ g ò g ŏ g ò

ò

```
-----GDISGTISGNT 1181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1182 VTLTATEGALAVSNISGNTVTVTANSGALTTLAGSTIKGTESVTTSSQSGDIGGTISGGT 1241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1182 VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1242 ATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVA 1301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1302 GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN 1361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1362 GLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG 1421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1065 IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTI 1124
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1005 INITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLT 1064
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     945 NDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDK 1004
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        : ||: |||:| | : : : | ||:|| :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | | :: | :: | | :: | | :: | | :: | | :: | :: | | :: | :: | | :: | :: | | :: | :: | | :: | :: | | :: | :: | | :: | :: | :: | | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: | :: 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   885 NGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVT 944
651 NTS-YWQTSHDSHWNVSALNLETGANFTF-IKYISSNSKGLTTQYRSSAGVNFNGVNGNM 708
                                                                                                                         650 NESGYDKFKGRTYWNLTSLNVSESGEFNLTIDSRGSDSAGTLTQPYNLNGISF---NKDT 706
                                                                                                                                                                                                                                                  709 SFNLKEGAKVNFKLKPNENMNTSKPLP-IRFLANITATGGGSVFFDIYANHSG---RGAE 764
                                                                                                                                                                                                                                                                                                                                                                    707 TENVERNARVNFDIKAPIGINKYSSLNYASFNGNISVSGGGSVDFTLLASSSNVQTPGVV 766
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             765 LKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAIN 824
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        767 INSKYFNVSTGSSLRFKTSGSTKTGFSIEKDLTLNATGGNITLLQVEGT--DGMIGKGIV 824
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        825 STYNISILGGNVTLGGQNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLV 884
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1422 VSAVRFVEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Haemophilus influenzae strain 12 HMW1A protein, SEQ ID NO:67.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              HMW protein; hmw gene; hmwAl; hmwA2; high molecular weight; non-typeable Haemophilus influenzae; NTHi; non-encapsulated;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1125 TAKNVEVNKDITSLKTVNITA-SEKVTTTAGSTINATNGKASITTKT----
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1171 -----
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        AAB01846 standard; Protein; 1536 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   11-SEP-2000 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          AAB01846;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XXX XXX XXX
```

```
recombinant production; Escherichia coli, antibacterial, vaccine;
human disease; otitis media; epiglottitis; pneumonia; tracheobronchitis;
                                                                                  detection; diagnosis.
```

Haemophilus influenzae strain 12

13-APR-2000

WO200020609-A2.

99WO-CA00938 07-0CT-1999; 98US-0167568 98US-0206942 07-0CT-1998; 08-DEC-1998;

(CONN-) CONNAUGHT LAB LTD.

Klein MH; Yang Y, Loosmore SM,

WPI; 2000-303789/26. N-PSDB; AAA52195

producing recombinant high molecular weight proteins of Haemophilus which are used as a vaccine to provide protection against Haemophilus induced diseases in humans Nucleic acid molecule for

Example 16; Fig 28A-Q; 307pp; English.

The invention relates to the recombinant production of Haemophilus influenzae high molecular weight (HMW) proteins in Bscherichia coli. The expression construct used to effect recombinant expression comprises a promoter functional in E. coli (e.g., the 77 promoter) operably linked to a modified himwABC operon from a non-typeable (non-encapsulated) H. clusters termed humwlaBC and humw2ABC. Each humwABC operon comprises humwA, humwB and humwC genes encode accessory proteins which are cresponsible for post-translational processing and secretion of the HWWA proteins. The modified humwBC operon used in the expression construct of proteins. The modified humwBC operon used in the expression construct of the invention contains an A gene modified such that it encodes only the mature HWWA. The invention also discloses humw agenes (AAAS1275-AS2198) and HWWA proteins (AAB01824-B01849) from the non-typeable H. influenzae (c. strains Joyc, Kl, Kl, LCDC2, PMH1, 15 and 12. The nucleic acids and vectors are used for the production of recombinant H. influenzae HWW proteins which can be used as vaccines to mediate a humoral or cell.mediated immune response to provide protection against diseases in humans caused by H. influenzae (e.g., oftitis media, epiglottitis, con mignens in immunoassays for detecting antibodies against Haemophilus, HWW proteins can be used to isolate and clone hum genes from other constructs and proteins can be used to isolate and clone hum genes from other constructs and proteins and tracheobronchitis). The HW proteins are also used to isolate and clone hum genes from other constructs and influenzae. The multipodies against Haemophilus, HWM proteins can be used to isolate and clone hum genes from other constructs and the sequence represents an HWMA protein an on-typeable strain of Haemophilus yie hybridisation reactions. The

1536 AA; Seguence NAMES OF COLOR COL

20; SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120 61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDDIINWKQFNIDQNEMVQFLQENN 120 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180 Indels 98; Gaps 09 1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT Length 1536; 66.7%; Score 4943; DB 21; ilarity 67.1%; Pred. No. 5.4e-227; Conservative 147; Mismatches 267; Similarity Matches 1043; Query Match Local 61 121 ò g ò g δ

```
ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           NDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDK 1004
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1182 VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1241
                                                                                                                                                                                                                                                                   IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTI 1124
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         537
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       590
                                                                                                                                                                                                                                                                                                                                                                                                                                                               SCHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTG-EASDPKKNSEL 479
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  593
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 706
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          764
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        824
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       884
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     944
                                241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV
                                                                                                                                                                                                                                     LSAKEGEAEIGGVISAQNQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE
                                                                                                                                                                                                                                                                                                                                                                              GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          GTVTITGEGKDFRANNVSLNGTGKGLNIISSVNN---LTHNLSGTINISGNITINQTTRK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     NTS-YWQTSHDSHWNVSALNLETGANFTF-IKYISSNSKGLTTQYRSSAGVNFNGVNGNM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        650 NESGYDKFKGRTYWNLTSLNVSESGEFNLTIDSRGSDSAGTLTQPYNLNGISF---NKDT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SFNLKEGAKVNFKLKPNENMNTSKPLP-IRFLANITATGGGSVFFDIYANHSG---RGAE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       TFNVERNARVNFDIKAPIGINKYSSLNYASFNGNISVSGGGSVDFTLLASSSNVQTPGVV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  LKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     INSKYFNVSTGSSLRFKTSGSTKTGFSIEKDLTLNATGGNITLLQVEGT--DGMIGKGIV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              STYNISILGGNVTLGGQNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              : ||: |||: || : : | ||:|| |||| :: | | : || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: || :: ||
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            NGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                SGNLTAGGNIVNIAGNLTVESNANFKAITNFTFNVGGLFDNKGNSNISIAKGGARFKDID
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDIT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ----SKGGNLTIYSGGWVDVHKNITLD-QGFLNITA-ASVAFEGGNNKARDAANAKIVAQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          591 GTIT-SGNOKGFRFNNVSLNGTGSGLOFTTKRTNKYALTNKFEGTLNISGKVNISMVLPK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1182 VTLTATEGALAVSNISGNTVTVTANSGALTTLAGSTIKGTESVTTSSQSGDIGGTISGGT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           TAKNVEVNKDITSLKTVNITA-SEKVTTTAGSTINATNGKASITTKT--
  181
                                                           181
                                                                                                                                                                                                                                                                                                                                                                                                   361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             479
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      540
                                                                                                                                                                                                                                  301
                                                                                                                                                                                                                                                                                        301
                                                                                                                                                                                                                                                                                                                                                 361
                                                                                                                                                                                                                                                                                                                                                                                                                                                            421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     883
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1065
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          707
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               765
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1005
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1003
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1063
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1125
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1171
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     167
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              825
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            885
                                                                                                                    δ
                                                                                                                                                                       g
                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                     QQ
                                                                                                                                                                                                                                                                                                                                                 ŏ
                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               염
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ŏλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               9
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ŏ
```

```
1242 VEVKATESLTTQSNSKIKATTGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1301
                                                                 1362 GLNIISKDGRNTVRERGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG 1421
                                                                                                                                                                                                     The isolation and purification of the high molecular weight protein enables the identification of the major protective epitopes of the protein by conventional epitope mapping. These epitopes can then be synthesised using standard techniques and incorporated into fully synthetic or recombinant vaccines. This sequence is claimed to be the same as that given in ARR41723 (High molecular weight protein 1) although it does differ slightly. (Repeated regions which are possibly incorrect and occur in the corresponding nucleotide coding sequence contribute to these differences).
                                                    1242 ATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVA 1301
                                                                                                                 1302 GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN 1361
                                                                                                                                                                                                                                                 1422 VSAVRFVEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                                                                                                                                      1482 VSAVRFIEPNNTITVDTQNEFATRPLSRIVISEGRACFSNSDGATVCVNIADNGR 1536
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Key Location/Qualifiers
Misc-difference 668..677
/note= "Possibly incorrect sequence. Alternative sequence for this region is LNVSESGEFN. (See comments)."
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                HWM; high molecular weight protein; virus; vaccine; influenza; epitope; immunity; haemophilus influenzae; gene cluster.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (BARE/) BARENKAMP S J.
(INRM ) INSERM INST NAT SANTE & RECH MEDICALE.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    High molecular weight protein 1 (HMW1).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Claim 3; Figure 2/10; 100pp; English.
                                                                                                                                                                                                                                                                                                                                                                     AAR41725 standard; Protein; 1536 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      93WO-US02166.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   92GB-0005704
                                                                                                                                                                                                                                                                                                                                                                                                                                       26-APR-1994 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       WPI; 1993-320683/40.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        N-PSDB; AAQ49508
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       16-MAR-1992;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      16-MAR-1993;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     30-SEP-1993.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    WO9319090-A
                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                   ò
                                                                                                                                                  QQ
                                                                                                                                                                                   ò
                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                     δŏ
```

1536 AA;

Sequence

```
20;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         945 NDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDK 1004
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       885 NGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVT 944
                                                                                                                                                                                                                                                                                                                                                                                             540 ----SKGGNLTIYSGGWVDVHKNITLD-QGFLNITA-ASVAFEGGNNKARDAANAKIVAQ 593
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          594 GTVTITGEGKDFRANNVSLNGTGKGLNIISSVNN---LTHNLSGTINISGNITINQTTRK 650
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                651 NTS-YWQTSHDSHWNV-SALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNM 708
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     709 SFNLKEGAKVNFKLKPNENMNTSKPLP-IRFLANITATGGGSVFFDIYANHSG---RGAE 764
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            765 LKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAIN 824
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 825 STYNISILGGNVTLGGQNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLV 884
                                                                                                                                                                                                                                                                                                                                        361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                 SCHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTG-EASDPKKNSEL 479
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     480 KTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGORGGGVQIDGDIT 539
                                                                                                       181 ARNFTFEOTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                             241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                  241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                           301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                             121 NSAVFNRVTSNQISQLKGILDSNGOVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                            Indels 98; Gaps
                                                                   1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
Length 1536;
 Ouery Match 66.5%; Score 4924; DB 14;
Best Local Similarity 67.0%; Pred. No. 4.3e-226;
Matches 1042; Conservative 147; Mismatches 268;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Óγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           òχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ōλ
                                                                                                                                                                                          ad
                                                                                                                                                                                                                     οχ
                                                                                                                                                                                                                                              QQ
                                                                                                                                                                                                                                                                         Ω
                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                             δy
                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                  δý
                                                                                                                                                                                                                                                                                                                                                                                                          ОР
                                                                                                                                                                                                                                                                                                                                                                                                                                      δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                              рp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              οy
                                                                                 qq
                                                                                                            οy
                                                                                                                                       qq
                                                                                                                                                                 Óγ
```

```
1005 INITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLT 1064
          1003 INITKQITIKAGVDGENSDSDATNNANLTIKTKELKLTQDLNISGENKAEITAKDGSDLT 1062
                                        IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTI 1124
                                                   1182 VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1241
                                                                                                                                 -----GDISGTISGNT 1181
                                                                                                                                                                             1242 ategaatltatgntltteagssitstkgvdllaqngsiagsinaanytlntgtlttva 1301
                                                                                                                                                                                                                        1302 GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN 1361
                                                                                                                                                                                                                                                             GLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG 1421
                                                                                                                                                                                                                                                                                                      1125 TAKNVEVNKDITSLKTVNITA-SEKVTTTAGSTINATNGKASITTKT------
                                                                                                                                        1422 VSAVRFVEPNNTITVNTONEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                                                                                                                                                                                                               Non-typeable Haemophilus; high molecular weight surface protein; HMM3; immunogen; vaccine; otitis media.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Non-typeable Haemophilus high mol.wt. surface protein HMW3.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /note= "encoded by TGT"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /note= "encoded by GTG'
                                                                                                                                                                                                                                                                                                                                                                                                         AAW30291 standard; Protein; 1598 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Location/Qualifiers
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Haemophilus influenzae strain 5.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        96US-0617697.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    97WO-US04707
                                                                                                                                                                                                                                                                                                                                                                                                                                                    (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (BARE/) BARENKAMP S J.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   WPI; 1997-503038/46.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Misc-difference 113
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Misc-difference 864
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              N-PSDB; AAT90992
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         WO9736914-A1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   01-APR-1997;
                                                                                                                                                                                                                                                                                                                                                                                                                                                   14-APR-1998
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       01-APR-1996;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              09-OCT-1997
                                                                                                                                                                                                                                                                                                                                                                                                                               AAW30291;
                                                                                                                          1171
                                                                                                                                                                                                                                                                                           1362
                                                                                                                                                                                                                                                                                                                                                                                                  AAW3029;
                                       δy
                                                           g
                                                                                ò
                                                                                                 g
                                                                                                                                           QQ
                                                                                                                        δ
                                                                                                                                                                 ò
                                                                                                                                                                                     g
                                                                                                                                                                                                        à
                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                  à
                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                      qq
```

```
This protein comprises the high molecular weight surface protein than (125 kba) of non-typeable Haemophilus influenzae strain 5 that has the immunological ability to protect against disease caused by a non-typeable Haemophilus strain and is characterised by at least one surface-exposed B-cell epitope that is recognised by monoclonal solated hmw3 agene (see AAT90992). HWM1 (see AAW30293), HWM2 (see AAW30294) and HWW4 (see AAW30292) have also been identified. A conjugate comprising HWW3 linked to an antigen, hapten or corresponding to at least protective epitope of f-150 amino acids corresponding to at least protective epitope of HWW3 are also claimed. HWW proteins, conjugates and peptides can be used in vaccines, as immunogens for preparation of antibodies and as
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDP--KKNSE 478
                                                                                                                                                                                                                                                                                                                                                                                            Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                    TSKGGNLTIYSGGWVDVHKNITLDQGFLNITA--ASVAFE--GGNNKARDAANAKIVAQG 594
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       TVTITGEGKDFRANNVSLNGTGKGLNIISS-----VNNLTHNLSGTINISGNITINQ 646
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     TIT-SGNSNGFRFNNVSLNSLGGKLSFTDSREDRGRRTKGNISNKFDGTLNISGTVDISM 650
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   647 TTRKNTSYWQTSHDSHWNVSALNLETGANFTF-IKYISSNSKGLTTQYRSSAGVNFNGVN 705
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     651 KAPKVSWFYRDKGRIYWNVTLNVISGSKFNLSIDSIGSGSTGPSIRNAELNGITFN--- 707
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           LKTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          DB 18; Length 1598;
                                                                                                                                                                                                                                                                                                                                                                                Matches 1019; Conservative 143; Mismatches 281; Indels 187;
      proteins of non-typeable Haemophilus
                                                                                                                                                                                                                                                                                                                                                                        Pred. No. 1e-217
High molecular weight proteins of non-typer influenzae - useful for vaccine production
                                                                                                                                                                                                                                                                                                                                                         64.1%; Score 4748.5;
                                              Claim 1; Page 93-97; 183pp; English.
                                                                                                                                                                                                                                                                                                                                                                      62.5%;
                                                                                                                                                                                                                                                                                                                       1598 AA;
                                                                                                                                                                                                                                                                                                                                                                 Similarity
                                                                                                                                                                                                                                                                                                                       Seguence
                                                                                                                                                                                                                                                                                                                                                    Query Match
                                                                                                                                                                                                                                                                                                                                                                      Local
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         478
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         539
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       595
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      592
 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ô
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                á
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ōλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ă
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               a
```

```
1287 ANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAA 1346
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1347 TSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKV 1406
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1468 TSSSVNITGDLNTINGLNIISENGRNTVRLRGKEIDVKYIQPGVASVEEVIEAKRVLEKV 1527
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1407 KDLSDEERETLAKLGVSAVRFVEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGAR 1466
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1528 KDLSDEERETLAKLGVSAVRFVEPNNAITVNTQNEFTTKPSSQVTISEGKACFSSGNGAR 1587
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ---GTISGNTVNVT 1226
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1227 ANAGDLTVGNGAEINATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINA 1286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 : :|| ||||:||:|| || :|| || :|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:|| ||:||
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1180 NTVSVS-----ATVD---LTTKSGSKIEAKSGEANVTSATG-------1212
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1288 ATGATLAVGNISGNTVTITADSGKLTSTVGSTINGTNSVTTSSQSGDIEGTISGNTVNVT 1347
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    993 QKEGNLTISSDKINITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNK 1052
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1053 AEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGR 1112
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1052 AEITAKNGSDLTIGNASGGN--ADAKKVTFDKVKDSKISTDGHNVTLNSEVKT--SNGSS 1107
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1168 TIKGNITSONVTVTATENLVTTENAVINATSGTVNISTKTGDIKGGIESTSGNVNITASG 1227
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      933 ITQGVVKLGNVTNDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNIS 992
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 706 GNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFLAN-----ITATGGGSVFFDIYANH 758
                                                                             708 -KATFNIAQGSTANFSIK-----ASIMPFKSNANYALFNEDISVSGGGSLNFKLNASS 759
                                                                                                                                                                           759 SG---RGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFY 815
                                                                                                                                                                                                                                                         760 SNIQTPGVIIKSONFNVSGGSTLNLKAEGSTETAFSIENDLNLNATGGNITIRQVEGT-- 817
                                                                                                                                                                                                                                                                                                                                                 816 DGYARNAINSTYNISILGGGNVTLGGQNSSSSITGNITIEKAANVTLE-ANNAPNQO--NI 872
                                                                                                                                                                                                                                                                                                                                                                                                                                          818 DSRVNKGVAAKKNITFKGGNITFGSQKATTEIKGNVTINKNTNATLRGANFAENKSPLNI 877
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  873 RDRVIKLGSLLVNGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEIN 932
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ---TASEKVTTTAGSTINATNGKASITTKTGDISG------TISG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1213 -----TIG------
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   AAR41731 standard; Protein; 1338 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              26-APR-1994 (first entry)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1467 VCTNVADDGQ 1476
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1588 VCTNVADDGQ 1597
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           AAR41731;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δλ
                                                                                                                                                                                                                                                                                                                                                 δλ
```

```
| |: |: |: |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             61 AKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGEGKNGIQLAKKTTLEKGSTIN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           499 NITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITSKGGNLTIYSGGWVDVHKN 558
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   615 TGKGLNIISS-----VNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHDSHWNVS 666
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        667 ALNLETGANFTF-IKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPN 725
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     381 VSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVETSGHDLFIKDNAIVDAKEWLL 440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           441 DFDNVSINAEDPLFNNTGINDEFPTGTGEASDP--KKNSELKTTLTNTTISNYLKNAWTM 498
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       559 ITLDQGFLNITA--ASVAFE--GGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNG 614
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         261 VNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIVLSAKEGEAEIGGVISAQNQQ 320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               321 AKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKGSTIN 380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       The isolation and purification of the high molecular weight protein enables the identification of the major protective epitopes of the protein by conventional epitope mapping. These epitopes can then be synthesised using standard techniques and incorporated into fully synthetic or recombinant vaccines.
                                                                                HMW; high molecular weight protein; virus; vaccine; influenza; epitope; immunity; haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         High molecular weight surface proteins - of non-typeable haemophilus which exhibit immunogenic properties
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (BARE/) BARENKAMP S J.
(INRM ) INSERM INST NAT SANTE & RECH MEDICALE.
                      High molecular weight protein 3 (HMW3).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Claim 5; Figure 10; 100pp; English.
                                                                                                                                                                                                                                                                                                                                                                                                                                                   92GB-0005704
                                                                                                                                                                                                                                                                                                                                                                                  93WO-US02166
                                                                                                                                                                                       Haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             WPI; 1993-320683/40.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1338 AA;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            N-PSDB; AAQ49510.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Barenkamp SJ;
                                                                                                                                                                                                                                                                                                                                                                                  16-MAR-1993;
                                                                                                                                                                                                                                                                                                                                                                                                                                                   16-MAR-1992;
                                                                                                                                                                                                                                                        WO9319090-A.
                                                                                                                                                                                                                                                                                                                     30-SEP-1993.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Matches
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Сp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δλ
δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
```

775 519	835	892 631	952 691	1012 751	1072 811	1132 867	1150 927	1189	1212	1246	1306	1366	1426 1287	
6 ENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNG :	6 ANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGN :	6 VTLGGQNSSSSITGNITIEKAANVTLE-ANNAPNQQNIRDRVIKLGSLLVNGSLSLTG 	3 ENADIKGNLTISESAPFKGKTRDŢLNITGNFTNNGTAEINITOGVVKLGNVTNDGDLNIT 	3 THAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISOKEGNLTISSDKINITKQIT 	SIKKGIDGEDSSSDATSNANLTIKTKELKLTBDLSISGFNKAEITAKDGRDLTIGNSNDGN       :	SGAEAKTVTFNNVKDSKISADGH  :  .  :  :      - ADAKKVTFDKVKDSKISTDGH	KDITSLKTVNI	TTAGSTINATNGKASITTKTGDISGTISGNTVSVS    :     :              TFNAVINATSGTVNISTKTGDIKGGIESTSGNVNITASGNTLKVSNI	-LTTKSGSKIEAKSGEANVTSATG	TIGGTISGNTVNVTANAGDLTVGNGAEINATEGA  :	ATLTATGNTLTTBAGSSITSTKGOVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIK 	ATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNII 	SKDGRNTVRLRCKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVR  ::	EVEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476 
72(	776	836	632	953	1013 752	1073	1133	1151 928	1190 988	1213 1048	1247	1307 1168	1367	1427
Qy	Oy Dp	Qy Db	Qy	Oy Db	Qy	Oy Dp	Oy Dp	oy og	Oy Dp	Oy Db	Qy Db	Qy	Qy	Qy

Search completed: March 24, 2003, 15:22:26 Job time : 59 secs 69

Sequence Sequence

Sequence sednence Sequence Sequence Sequence Sequence Sequence Sequence Sequence

Sequence Sequence Sequence

Sequence

```
1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Ouery Match 100.0%; Score 7407; DB 1; Length 1477; DB 25 Best Local Similarity 100.0%; Pred. No. 0; Matches 1477; Conservative 0; Mismatches 0; Indels 0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CORRESPONDENCE ADDRESS:
CORRESPONDENCE ADDRESS:
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza STREET: Bldg. 1
CITY: Arlington
STRTE: Virginia
COTY: Virginia
COUNTRY: U.S.A.
ZIP: 22202-0286
COMPUTER: FLOPPY disk
COMPUTER: TEM PC COMPATIBLE
OMPUTER: TEM PC COMPATIBLE
OMPUTER: PATENTIN Release #1.0, Version #1.25
CURRENT APPLICATION DATA:
APPLICATION NUMBER: US/08/038,682
FILING DATE: 16-MAR-1993
CLASSIFICATION: 16-MAR-1993
ACTORNEY/AGENT INFORMATION:
NAME: BERKSTRESSER, JERRY W
RECIGNARION NUMBER: 1038-293
TELECOMMUNICATION NUMBER: 1038-293
TELECOMMUNICATION NUMBER: 1038-293
TELECOMMUNICATION NUMBER: 1038-293
                                                                                                                                                                                                                                                                                                                                                                                                                                                 APPLICANT: BARENKAMP, STEPHEN J
APPLICANT: ST. GEME III, JOSEPH W
TITLE OF INVENTION: HIGH MOLECULAR WEIGHT SURFACE PROTEINS
TITLE OF INVENTION: OF NON-TYPEABLE HARMOPHILUS
US-09-206-942-61

US-09-206-942-30

US-09-206-942-32

US-09-206-942-31

US-09-206-942-31

US-09-206-942-41

US-09-206-942-65

US-09-206-942-69

US-09-206-942-69

US-09-206-942-65

                                                                                                                                                                                                                                                                                                                         ALIGNMENTS
                                                                                                                                                                                                                                                                                                                                                                       RESULT 1
US-08-038-682-4
Sequence 4, Application US/08038682
Patent No. 5549897
GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           TELEPHONE: (703) 415-0810
TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 4:
SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       LENGTH: 1477 amino acids
TYPE: amino acid
STRANDEDNESS: single
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ; MOLECULE TYPE: protein US-08-038-682-4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 NUMBER OF SEQUENCES: 8
CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          linear
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          TOPOLOGY:
                                                                                                                                                                             2678.5
2647.5
2609.5
2609.5
2584.5
2553.5
 3225.5
3225.5
3184
3153
2970.5
2939.5
2864
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Sequence 4, Appli
Sequence 4, Appli
                                                                                                                 March 24, 2003, 15:24:19; Search time 18 Seconds (without aliquments) 2414:314 Million cell updates/sec
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution
                                                                                                                                                                                                             1 MNKIYRLKFSKRLNALVAVS......CFSSGNGARVCTNVADDGOP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         67
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Description
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Sequence 4,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Sequence 7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Sequence 3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Sequence
Sequence
Sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Seguence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Sequence
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           edneuce
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Issued_Patents_AA:*
1: /cgn2_6/ptodatca/2/iaa/5A_COMB.pep:*
   /cgn2_6/ptodatca/2/iaa/5B_COMB.pep:*
3: /cgn2_6/ptodatca/2/iaa/6A_COMB.pep:*
4: /cgn2_6/ptodatca/2/iaa/6B_COMB.pep:*
5: /cgn2_6/ptodatca/2/iaa/PCTUS_COMB.pep:*
6: /cgn2_6/ptodatca/2/iaa/PcTUS_COMB.pep:*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            00/
                  GenCore version 5.1.4\_p5\_4578 Copyright (c) 1993 - 2003 Compugen Ltd.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          US-08-469-880-2
US-08-728-470-2
US-08-719-641-2
US-08-719-641-2
US-08-719-641-10
US-08-719-641-10
US-08-719-641-10
US-08-719-641-10
US-08-719-641-10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        US-08-719-641-9
US-09-206-942-51
US-09-206-942-53
US-09-206-942-59
US-09-206-942-59
                                                                                                                                                                                                                                                                                                                            Total number of hits satisfying chosen parameters:
                                                                                                                                                                                                                                                                                            262574 segs, 29422922 residues
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  SUMMARIES
                                                                                                                                                                                                                                                                                                                                                                                                      Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries
                                                                                  OM protein - protein search, using sw model
                                                                                                                                                                                                                                                              Gapop 10.0 , Gapext 0.5
                                                                                                                                                                                                                                                                                                                                                          Minimum DB seq length: 0
Maximum DB seq length: 200000000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Match Length DB
                                                                                                                                                                                 US-10-092-880-4
                                                                                                                                                                                                                                               BLOSUM62
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Query
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4751.5
3525.5
3525.5
3396.5
3365.5
3260
                                                                                                                                                                                 Title:
Perfect score:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Score
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          4967
4956
4956
4943
                                                                                                                                                                                                                                               Scoring table:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Database :
                                                                                                                                                                                                                                                                                              Searched:
                                                                                                                                                                                                                 Sequence:
                                                                                                                    Run on:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Result
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Š.
```

; 0

0; Gaps

0; Indels

qq

Sequence

```
1081 TENNYKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1081 TFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
           NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                    ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                             241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                           SIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 1020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                         LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                     GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                               840
                                                                                                                                                                                                                                                               SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 480
                                                                                                                                                                                                                                                                            TTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDITS 540
                                                                                                                                                                                                                                                                                                                     KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600
                                                                                                                                                                                                                                                                                                                                                               EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 660
                                                                                                                                                                                                                                                                                                                                                                                                      SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                   KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            QNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR 960
                                                                                               NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG
                                                              121
                                                                                    181
61
                    61
                                          121
                                                                                                                                                                         301
                                                                                                                                                                                                                                                                                                                                                  541
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1021
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1021
                                                                                                                                                                                                                     361
                                                                                                                                                                                                                                                                                   421
                                                                                                                                                                                                                                                                                                         481
                                                                                                                                                                                                                                                                                                                              481
                                                                                                                                                                                                                                                                                                                                                                        541
                                                                                                                                                                                                                                                                                                                                                                                                                601
                                                                                                                                                                                                                                                                                                                                                                                                                                                            199
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 721
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     721
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           781
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                781
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     901
                                                                                                                                                                                                                                                              421
                                                                                                                                                                                                                                                                                                                                                                                             601
                                                                                                                                                                                                                                                                                                                                                                                                                                      661
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       841
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            961
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 196
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                901
ò
                  Q
                                                             g
                                         ö
                                                                                    ŏ
                                                                                                        g
                                                                                                                            ò
                                                                                                                                                  qq
                                                                                                                                                                        à
                                                                                                                                                                                             Dp
                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                       q
                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                             à
                                                                                                                                                                                                                                                                                                         ð
                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                           셤
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ŏ
```

```
1261 GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                  1141 VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                               KSGEANVISATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA 1260
                                                                                                                                                               GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                                                                                      1201 KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA
                                                                                                                                                                                                                                             LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE
                                                                                                                                                                                                                                                                                                                            1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Protei
TITLE OF INVENTION: of No. 5603938-Typeable Haemophilus
NUMBER OF SEQUENCES: 8
CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
CITY: Arlington
STATE: Virginia
COUNTRY: U.S.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NYSTEM: PC-DOS/MS-DOS
PatentIn Release #1.0, Version #1.30
                                                                                                                                                                                                                                                                                                                                                                                                                               EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PRIOR APPLICATION DATA:
APPLICATION NAMER: US pct/us93/02166
FILING DATE: 16-MAR-1993
ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            CURRENT APPLICATION DATA:
APPLICATION NUMBER:
FILING DATE: 16-5EP-1994
CLASSIFICATION: 435
PRIOR APPLICATION NUMBER:
APPLICATION NUMBER:
APPLICATION NUMBER: 69205704.1
FILING DATE: 16-MAR-1992
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Sequence 4, Application US/08302832 Patent No. 5603938 GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      COMPUTER: IBM PC compatible OPERATING SYSTEM: PC-DOS/MS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
REFERENCE/DOCKET NUMBER: 103
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           TELECOMMUNICATION INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          TELEPHONE: (703) 415-0810
TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 4:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ZIP: 22202-0286
COMPUTER READABLE FORM:
MEDIUM TYPE: Floppy disk
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1477 amino acids
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     STRANDEDNESS: single
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      amino acid
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            linear
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          TOPOLOGY:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               SOFTWARE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       US-08-302-832-4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              US-08-302-832-4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    TYPE:
                                                                               1201
                                                                                                                                                               1261
                                                                                                                                                                                                                                             1321
                                                                                                                                                                                                                                                                                      1321
                                                                                                                                                                                                                                                                                                                                                                                                              1441
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 RESULT 2
                                    q
                                                                             δy
                                                                                                                    q
                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                             δy
                                                                                                                                                                                                                                                                                      QQ
                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                              δy
                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                          ŏ
```

100.0%; Score 7407; DB 1; Length 1477;

Query Match

```
.;
0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1021 DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                SIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 1020
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             841 QNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             901 LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR 960
                                                                                                                                                                                                                                                                                                                                                                                        601 EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                                                                                    61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                       181 ARNETFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                        241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                        LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                        361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFALVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                    541 KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600
                                                                                                                                        121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                        61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                 0; Gaps
                                                    1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                 0; Indels
                 Mismatches
       0
     Pred. No.
100.0%; Pre
       Best Local Similarity 100.0
Matches 1477; Conservative
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    961
                                                                                                                                                                                                                                                                                             301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                           ογ
                                                                                                                                                                                                                                                                                                                                                                    q
                                                                                                                                                                                                                                                                                                                                                                                             οy
                                                                                                                                                                                                                                                                                                                                                                                                                    q
                                                                                                                                                                                                                                                                                                                                                                                                                                              Ω
                                                                                                                                                                    g
                                                                                                                                                                                           ŏ
                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                  Db
                                                                                                                                                                                                                                                                                           δý
                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                             òγ
```

```
LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                                                                                                                                                                                                                                                                                                                                                                                 1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                    1201 KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTEA 1260
                                                                                                                                                                                          1261 GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
1021 DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                  1081 TFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                GENERAL INFORMATION:
APPLICANT: BARENKAMP, STEPHEN J
APPLICANT: ST. GEME III, JOSEPH W
APPLICANT: ST. GEME III, JOSEPH W
TITLE OF INVENTION: HIGH MOLECULAR WEIGHT SURFACE PROTEINS
TITLE OF INVENTION: OF NON-TYPEABLE HAEMOPHILUS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    NUMBER OF SEQUENCES: 8
CORRESPONDENCE ADDRESS:
ADDRESSER: Shoemaker and Mattare, Ltd
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              IBM PC compatible sysTEM: PC-DOS/MS-DOS PatentIn Release #1.0, Version #1.25
                                                                                                                                                                                                                                                                                                                                                                                                                                                        1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       OFFWARE: PATERLA.
SOFFWARE: PATERLA.
CURRENT APPLICATION DATA:
APPLICATION NUMBER: US/08/530,198
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                US-08-530-198-4
; Sequence 4, Application US/08530198
; Patent No. 5869065
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    FILING DATE: 13-DEC-1995
CLASSIFICATION: 424
ATTORNEY/AGENT INFORMATION:
NAME: BERKSTRESSER, JERRY W
REGISTRATION NUMBER: 22,651
REFERENCE/DOCKET NUMBER: JWB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     TELECOMMUNICATION INFORMATION:
TELEPHONE: (703) 415-0810
TELEPAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 4:
SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1477 amino acids
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     single
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     protein
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  COMPUTER: IBM PC of OPERATING SYSTEM:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   amino acid
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     linear
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           STATE: Virginia COUNTRY: U.S.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Arlington
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 STRANDEDNESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ; MOLECULE TYPE:
US-08-530-198-4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     TOPOLOGY:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  LENGTH:
                                                                                                                                                                                                                                                                                                                      1321
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   RESULT 3
                                                                                                                                                                                                                                                                                                                                                                                         δλ
                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                          οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                            qq
                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                 οy
                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                     П
                                                                                                           δy
                                                                                                                                                                              οy
```

```
.
                                                                        SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                  121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                       181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                             Gaps
                                                                                                                                                                                       241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                  LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                       GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                           SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 480
                                                                                                                                                                                                                                                                                                                              480
                                                                                                                                                                                                                                                                                                                                                 540
                                                                                                                                                                                                                                                                                                                                                                                      009
                                                                                                                                                                                                                                                                                                                                                                                         EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 660
                                   1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                              SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ONSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
                                                                                                                                                                                                                                                                                                                 TTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITS
                                                                                                                                                                                                                                                                                                                                                     KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR
                      ö
    Length 1477;
                     0; Indels
   DB 2;
100.0%; Score 7407;
100.0%; Pred. No. 0;
live 0; Mismatches
       Best Local Similarity 100.18
Matches 1477; Conservative
Query Match
                                                                                                                                                                                                                             301
                                                                                                                                                                                                                                                                 361
                                                                                                                                                                                                                                                                                    361
                                                                                                                                                                                                                                                                                                       421
                                                                                                                                                                                                                                                                                                                        421
                                                                                                                                                                                                                                                                                                                                           481
                                                                                                                                                                                                                                                                                                                                                                                                                     601
                                                                                                                                                                                                                                                                                                                                                                                                                                        601
                                                                                                                                                                                                                                                                                                                                                                                                                                                           199
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                721
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  721
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     781
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        781
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            841
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              841
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              661
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 901
                                                     Db
                                                                                       qq
                                                                        ò
                                                                                                            ò
                                                                                                                              a
                                                                                                                                                 ò
                                                                                                                                                                   g
                                                                                                                                                                                                         qq
                                                                                                                                                                                        ò
                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                      D
                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                           Q
                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                    ó
                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             염
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
```

```
DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                1021 DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                 TENNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                  1141 VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                                                                                                    1201 KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA 1260
                                                                                                                                                                                                                                                                          GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                              LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                                                                                                                                                                                                                                                                                                                                                               IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                                                                                                                                                                                 APPLICANT: Barenkamp, Stephen J.
TITLE OF INVENTION: High Molecular Weight Surface Proteins
TITLE OF INVENTION: Of No. 5876733-Typeable Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   SOFTWARE: Patentin Release #1.0, Version #1.30 CURRENT APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1038-516 MIS:vg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             UMBER: US PCT/US93/02166
16-MAR-1993
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      APPLICATION NUMBER: US/08/469,880
FILING DATE: 06-JUN-1995
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  US 08/302,832
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                9205704.1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             MEDIUM TYPE: Floppy disk
COMPUTER: IBM PC COMPATIBLE
OPERATING SYSTEM: PC-DOS/MS-DOS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Sequence 4, Application US/08469880 Patent No. 5876733
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    TELECOMMUNICATION INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             FILLING DATE: 16-SEP-1994
ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         APPLICATION NUMBER: GB 92
FILING DATE: 16-MAR-1992
PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  REFERENCE/DOCKET NUMBER:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              COMPUTER READABLE FORM: MEDIUM TYPE: Floppy of
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        NUMBER OF SEQUENCES: 8
CORRESPONDENCE ADDRESS:
ADDRESSEE: Shoemaker
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            FILING DATE: 16-MAR-1
PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            APPLICATION NUMBER:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              APPLICATION NUMBER:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               CITY: Arlington
STATE: Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 RY: U.S.A.
22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          CLASSIFICATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    US-08-469-880-4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              COUNTRY:
1021
                                                                 1081
                                                                                                                                                                                                                                                                        1261
                                                                                                                                                                                                                                                                                                                                             1321
                                                                                                                                                                                                                                                                                                                                                                            1321
                                                                                                                                                                                                                                                                                                                                                                                                               1381
                             Dp
                                                                 à
                                                                                                 g
                                                                                                                                  δ
                                                                                                                                                                     q
                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                        δ
                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                               δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                               셤
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
```

S

```
Q
                                                                                                                                                                                                                                                                                                                                                                                                              Op
                                                                                                                                                                                                                                                                                                                                                                                                                                       οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                             Вþ
                                                                                                                                                                                                                      QΩ
                                                                                                                                                                                                                                                                    οp
                                                                                                                                                                                                                                                                                             οy
                                                                                                                                                                                                                                                                                                                  QQ
                                                                                                                                                                                                                                                                                                                                           ΟŻ
                                                                                                                                                                                                                                                                                                                                                                                         δλ
                                                                                                                                                                        Db
                                                                                                                                                                                                 Qγ
                                                                                                                                                                                                                                               ŏ
                                                                                                                           qq
                                                                                                                                                   Ωy
                                 Op
                                                                             QQ
                                                                                                     δ
                                                                                                                                         .;
0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    781 NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                                                                                                                                                                                                          61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                       241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              541 KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720
                                                                                                                                                                                                                                                          121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                              61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                         Gaps
                                                                                                                                                                1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                              1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV
                                                                                                                                                                                                                                                                                                                                                                                                    301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                481 TTLINTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITS
                                                                                                                                                                                                                                                                                                          181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT
                                                                                                                                                                                                                                                                                                                                                                                                                                                  361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET
                                                                                                                                         0;
                                                                                                                   DB 2; Length 1477;
                                                                                                                                         Indels
                                                                                                                                         ;
                                                                                                                100.0%; Score 7407;
100.0%; Pred. No. 0;
iive 0; Mismatches
TELEPHONE: (703) 415-0810
TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 4:
SEQUENCE CHARACTERISTICS:
LENGTH: 1477 amino acids
                                                                                                                                           Matches 1477; Conservative
                                                          TYPE: amino acid
STRANDEDNESS: single
                                                                                  linear
                                                                                                                    Query Match
Best Local Similarity
                                                                                   ;
US-08-469-880-4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               601
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           721
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         οý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                 QQ
                                                                                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                                                                                              QQ
                                                                                                                                                                                                                                                                                                                                                                                                       δy
                                                                                                                                                                                                                                                                                                                                                                                                                          QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                            ò
```

```
IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                         VNITASEKVITTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                                                                                                                                                                                                                                                                                                          LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                                                                                   961 SIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 1020
                                                                                                              961 SIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 1020
                                                                                                                                                                  1021 DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                                                                                                                                          1081 TFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                                                                                                                                                                                                                                                     1201 KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                             901 LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR 960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
TITLE OF INVENTION: A No. 5928651-Typeable Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        SYSTEM: PC-DOS/MS-DOS
PatentIn Release #1.0, Version #1.30
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               US PCT/US93/02166
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     APPLICATION NUMBER: US/08/728,470
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PRIOR APPLICATION DATA:
APPLICATION NUMBER: US 08/302,832
FILING DATE: 16-MAR-1993
FILING DATE: 10-MAR-1993
APPLICATION DATA:
APPLICATION NUMBER: US PCT/US93/03
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Sequence 4, Application US/08728470 Patent No. 5928651
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               COMPUTER: IBM PC compatible OPERATING SYSTEM: PC-DOS/MS-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Floppy disk
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    CURRENT APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             COMPUTER READABLE FORM:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  NUMBER OF SEQUENCES: 1
CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   COUNTRY: U.S.A.
ZIP: 22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Arlington
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  CLASSIFICATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   MEDIUM TYPE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                FILING DATE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   SOFTWARE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           US-08-728-470-4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             STREET:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1261
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1321
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1261
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1381
```

```
ö
                                                                                                                                                                                                                                                                                                                             SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNBMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                           NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                        181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        480
                                                                                                                                                                                                                                                                            1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                                                                                                                                                                                                                                                                                                                                                                                                                         SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    TTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   0;
                                                                                                                                                                                                                                    DB 2; Length 1477;
                                                                                                                                                                                                                                  / Match 100.0%; Score 7407; Local Similarity 100.0%; Pred. No. 0;
                                                                                                                                                                                                                                                           Mismatches
                                                     NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
REFENCE/DOCKET NUMBER: 1038-633
TELEPHONE: (703) 415-0810
TELEPHONE: (703) 415-0813
INFORMATION FOR SEQ ID NO: 4:
SEQUENCE CHARACTERISTICS:
LENGTH: 1477 anino acids
        PRIOR APPLICATION DATA:
APPLICATION NUMBER: GB 9205704.1
FILING DATE: 16-MAR-1992
ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                                                          0,
FILING DATE: 16-MAR-1993
                                                                                                                                                                                                                                                      Matches 1477; Conservative
                                                                                                                                                                                STRANDEDNESS: single
TOPOLOGY: linear
                                                                                                                                                                       amino acid
                                                                                                                                                                                                        US-08-728-470-4
                                                                                                                                                                                                                                Query Match
                                                                                                                                                                                                                                                                                                                                                     61
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                121
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       481
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        541
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              661
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      601
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             601
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      661
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     721
                                                                                                                                                                                                                                                                                                      a
                                                                                                                                                                                                                                                                                à
                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                           à
                                                                                                                                                                                                                                                                                                                                                                                                  q
                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         á
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ó
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            QQ
```

```
SIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 1020
                                                                                                                                                                                                                                                                     DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                                                                                                                                                                                                                                                                             1081 TFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                                                                                                                                                                               1141 VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                                                                                                                                                                                                                                                                                                                                                         1201 KSGEANVTSATGTIGGTISGNTVNVTANAGDLFVGNGAEINATEGAATLTATGNTLTTEA 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1261 GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         721 KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                             781 NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840
                                                                                       841 QNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
                                                                                                                                                                  1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR
                                                                                                                                                                                                                                                                                                                                                                                                                                                               1321 LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
TITLE OF INVENTION: of No. 5977336-Typeable Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               COMPUTER: IBM PC compatible
OPERATING SYSTEM: PC-DOS/MS-DOS
SOFTWARE: Patentin Release #1.0, Version #1.30
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Shoemaker and Mattare, Ltd
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Sequence 4, Application US/08617697
Patent No. 5977336
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 COMPUTER READABLE FORM:
MEDIUM TYPE: Floppy disk
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                NUMBER OF SEQUENCES: 1
CORRESPONDENCE ADDRESS;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            CITY: Arlington
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ADDRESSEE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   APPLICANT:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              US-08-617-697-4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        COUNTRY:
                                                                                                                                                   901
                                                                                                                                                                                                             196
                                                                                                                                                                                                                                                                       1021
                                                         QQ
                             ò
                                                                                       ò
                                                                                                                   g
                                                                                                                                                                             Op
                                                                                                                                                   δλ
                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                      Op
                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                         ά
                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
```

```
òγ
                                                                                        Q
                                                                                                                           δy
                                                                                                                                                           qq
                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                  ó
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 481 TTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDITS 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              541 KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 601 EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             421 SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         0; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                 100.0%; Score 7407; DB 2; Length 1477; 100.0%; Pred. No. 0; tive 0; Mismatches 0; Indels 0;
                                                                                                                      APPLICATION NUMBER: US PCT/US93/02166 FILING DATE: 16-MAR-1993 ATTORNEY AGENT INFORMATION:
                                                                                                                                                                             NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22.651
REFERENCE/DOCKET NUMBER: 1038-557
TELECOMMUNICATION INFORMATION:
TELEPHONE: (703) 415-0810
           APPLICATION NUMBER: US/08/617,697
FILING DATE: 01-APR-1996
CLASSIFICATION: 424
PRIOR APPLICATION DATA:
APPLICATION NUMBER: US 08/302,832
FILING DATE: 05-00T-1994
                                                                                                                                                                                                                                            ILEPEANE: (703) 415-0810
TELEPAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 4:
SEQUENCE CHARACTERISTICS:
LENGTH: 1477 amino acids
                                                                                                                                                                                                                                                                                                                                                                                                                                      Best_Local Similarity 100.0
Matches 1477; Conservative
CURRENT APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                  STRANDEDNESS: single
TOPOLOGY: linear
                                                                                                              PRIOR APPLICATION DATA:
APPLICATION NUMBER:
                                                                                                                                                                                                                                                                                                                                      amino acid
                                                                                                                                                                                                                                                                                                                                                                                     US-08-617-697-4
                                                                                                                                                                                                                                                                                                                                                                                                                         Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          òγ
```

```
1081 TFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1141 VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1201 KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1261 GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1261 GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1321 LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1021 DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                                                                                                                                                                                                                                                                      961 SIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 1020
                                                                                                                          841 QNSSSSITGNITIEKAANVTLEANNAPNOONIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
                                                                                                                                                                                                          901 LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNOR 960
721 KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                                                                   APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
TITLE OF INVENTION: of No. 6218141-Typeable Haemophilus
NUMBER OF SEQUENCES: 10
CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
CITY: Arlington
STATE: Virginia
COUNTRY: U.S.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Sequence 4, Application US/08719641 Patent No. 6218141
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RESULT 7
US-08-719-641-4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ōλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                     рp
                                                                                                                                                                                                                                                                                                                                                                                                                                                        Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ōλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ДQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 óγ
                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                                                                       qq
```

```
61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          TILINTIISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITS 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        0;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       100.0%; Score 7407; DB 4; Length 1477; 100.0%; Pred. No. 0; Live 0; Mismatches 0; Indels 0;
                                     COMPUTER: IEM PC compatible
OPERATING SYSTEM: PC-DOS/MS-DOS
SOFTWARE: Patentin Release #1.0, Version #1.30
CURRENT APPLICATION DATA:
APPLICATION NUMBER: US/08/719,641
                                                                                                                                                                                                     US PCT/US93/02166
                                                                                                                                                        APPLICATION NUMBER: US 08/302,832
FILING DATE: 16-SEP-1994
                                                                                                                                                                                                                                                                                                                    1038-625
                                                                                                                                                                                                                            PRIOR APPLICATION DATA:
APPLICATION NUMBER: GB 9205704.1
                                                                                                                                                                                                                                                                                       NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
                                                                                                                                                                                                                                                                                                              REFERENCE/DOCKET NUMBER: 103
TELECOMMUNICATION INFORMATION:
TELEPHONE: (703) 415-0810
                                                                                                                                                                                                                                                                                                                                                        TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 4:
SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                                                          FILING DATE: 16-MAR-1992
ATTORNEY/AGENT INFORMATION:
                              Floppy disk
                                                                                                                                                                                                                  16-MAR-1993
                                                                                                                                                                                                                                                                                                                                                                                                  LENGTH: 1477 amino acids
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Best Local Similarity 100.
Matches 1477; Conservative
                                                                                                                                                                    FILING DATE: 16-SEP-1
PRIOR APPLICATION DATA:
               COMPUTER READABLE FORM:
                                                                                                                          CLASSIFICATION: 530
PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                             STRANDEDNESS: single
                                                                                                                                                                                                  APPLICATION NUMBER:
FILING DATE: 16-MAR
                                                                                                                                                                                                                                                                                                                                                                                                                   amino acid
                                                                                                                                                                                                                                                                                                                                                                                                                                             TOPOLOGY: linear
22202-0286
                           MEDIUM TYPE:
                                                                                                                 FILING DATE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                         US-08-719-641-4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Query Match
                                                                                                                                                                                                                                                                                      NAME:
                                                                                                                                                                                                                                                                                                                                                                                                                   TYPE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            121
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          481
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     481
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     β
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     d
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
```

ö

```
SIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 1020
                                                                                                                                                                                                                                                                                                                                                                             1021 DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                                                                                                                                                                                                                                                                                                                                                                        1081 TENNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                                                                                                                                                                                                                                                                       1141 VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1201 KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1261 GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1321 LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                              900
                                                    099
                                                                                            SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720
                                                                                                         721 KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                                                                                                                                       840
                                                                                                                                                                                                     1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1440
                                                                                                                                                                                                                                    841 QNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
                                                                                                                                                                                                                                                  901 LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR 960
                                                                                                                                                                                                                                                                                               KGGNLT1YSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG
            EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD
                                                          NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Sequence 71, Application US/09206942
Patent No. 6432669
GENERAL INFORMATION:
APPLICANT: LOGSMOLE, Sheena M.
APPLICANT: Yang, Yan-Ping
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    US-09-206-942-71
                                                                                            661
                                              601
                                                                                                                    661
                                                                                                                                                                                         781
                                                                                                                                                                                                                                                                                                                                961
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         RESULT 8
                      qq
                                              ò
                                                                    q
                                                                                            ŏ
                                                                                                                 q
                                                                                                                                         ò
                                                                                                                                                        , qq
                                                                                                                                                                                                             qq
                                                                                                                                                                                       à
                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                           QQ
                                                                                                                                                                                                                                                                                   ά
                                                                                                                                                                                                                                                                                                        ρp
                                                                                                                                                                                                                                                                                                                                δ
                                                                                                                                                                                                                                                                                                                                                     q
                                                                                                                                                                                                                                                                                                                                                                                                   Ωp
                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    \delta
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
```

```
.
0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 780
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   781 NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               TTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDITS 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             541 KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                             61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            181 ARNETFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                            61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
APPLICANT: Klein, Michel H.
TITLE OF INVENTION: Protective Recombinant Haemophilus Influenzae High
TITLE OF INVENTION: Molecular Weight Proteins
FILE REFERENCE: 1038-861 MIS: jb
CURRENT APPLICATION UNMER: US/09/206,942
CURRENT FILING DATE: 1998-12-08
EARLIER APPLICATION UNMER: 09/167,568
EARLIER FILING DATE: 1998-10-07
NUMBER OF SEQ ID NOS: 95
SOFTWARE: Patentin Ver. 2.1
SEQ ID NO 71
LENGTH: 1477
                                                                                                                                                                                                                                                                                                                                                                                         1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGFRYVTIFRCNHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                 0; Gaps
                                                                                                                                                                                                                                                                                                                                                                   1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                        Query Match 98.0%; Score 7261; DB 4; Length 1477; Best Local Similarity 98.4%; Pred. No. 0; Matches 1454; Conservative 3; Mismatches 20; Indels 0
                                                                                                                                                                                                                            ; ORGANISM: Haemophilus influenzae US-09-206-942-71
                                                                                                                                                                                                                        TYPE: PRT
                                                                                                                                                                                                                                                                                                   Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    481
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                          Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Dρ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     οý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       d
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ά
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Ω
                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ŏ
```

```
1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1261 GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1321 LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                                                                                                                                                                    1201 KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA 1260
                                                                                                                                                                                                                                                    1081 TFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 1140
                                                                                                                                                                                                                                                                                                                                                                   1141 VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 1200
                                                                                                                                                                                                                                   DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 1080
                                                                                                                         841 ONSSSSİTGNITLEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
                                                             901 LTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQR 960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    APPLICANT: Barenkamp, Stephen J
APPLICANT: Barenkamp, Stephen J
APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
TITLE OF INVENTION: Of No. 5977336-Typeable Haemophilus
NUMBER OF SEQUENCES: 11
CORRESPONDENCE ADDRESS:
ANDRESSEE: Shoemaker and Mattare, Ltd.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        SUFTWARE: Patentin Release #1.0, Version #1.30 CURRENT APPLICATION DATA:
FILTATION NUMBER: US/OR/F17 CT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1441 EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                IBM PC compatible
YSTEM: PC-DOS/MS-DOS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Sequence 10, Application US/08617697 Patent No. 5977336 GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Floppy disk
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               01-APR-1996
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 COMPUTER READABLE FORM:
MEDIUM TYPE: Floppy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Arlington
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    STATE: Virginia
COUNTRY: U.S.A.
ZIP: 22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   FILING DATE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            US-08-617-697-10
                                                                                                                                                                                                                                         1021
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Ωÿ
                                                                                                                                                                                                                                                                                                                                                                                                  QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           op<del>p</del>
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                  q
                                                                            q
                                                                                                            QΥ
                                                                                                                                          qq
                                                                                                                                                                          Óγ
                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                       φ
                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                       Ω
                                                                                                                                                                                                                                                                                                                                     Д
                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ΩÝ
```

```
SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                        NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Indels 142; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GKNGIQLAKKTSLEKGSTINVSGKEKGGFALVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           SCHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              481 TTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDITS 540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                              541 -KGGNLTIYSGGWVDVHKNITLDQGFLNITAA-SVAFEGGNNKARDAANAKIVAQGTVTI 598
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            659 HDSHWNVSALNLETGANFTFIKYISSNSKG--LTTQYRSSAGVNFNGVNGNMSFNLKEGA 716
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            599 TGEGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Length 1600;
                                                                                                                                                                                                                                                                                         Query Match 71.3%; Score 5282; DB 2;
Best Local Similarity 68.3%; Pred. No. 1.1e-292;
Matches 1099; Conservative 136; Mismatches 231;
                     APPLICATION NUMBER: US 08/302,832
FILING DATE: 05-OCT-1994
PRIOR APPLICATION DATA:
APPLICATION NUMBER: US PCT/US93/02166
FILING DATE: 16-MAR-1993
ATTORNEX/AGENT INFORMATION:
                                                                                                                                     1038-557
                                                                                                    NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
REFERENCE/DOCKET NUMBER: 103
TELECOMMUNICATION INFORMATION:
                                                                                                                                                          TELEPHONE: (703) 415-0810
TELERAX: (703) 415-0813
INPORMATION FOR SEQ ID NO: 10:
SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                LENGTH: 1600 amino acids
         PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                            single
                                                                                                                                                                                                                            amino acid
                                                                                                                                                                                                                                                         linear
CLASSIFICATION:
                                                                                                                                                                                                                                      STRANDEDNESS:
                                                                                                                                                        TELEPHONE:
                                                                                                                                                                                                                                                         TOPOLOGY:
                                                                                                                                                                                                                                                                  US-08-617-697-10
                                                                                                                                                                                                                                                                                                                                                                                                     61
                                                                                                                                                                                                                                                                                                                                                                                                                              61
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     420
                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                   ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
```

```
955 AKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIK 1014
                                                                                                                                                                                                                                                           :|| ||:||
1131 VTSHKTINISAAAGNVTTKEGTTINATTGSVEVTAQNGTIKGNITSQNVTVTATENLVTT 1190
                                                                                                                                                                                                                                                                                                    1015 KGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSG 1074
                                                                                                                                                                                                                                                                                                                                                              1075 AEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKD 1134
                                                                                                                                                                                                                                                                                                                                                                                                                                   -----TASEKVTTT 1152
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1153 AGSTINATNGKASITIKTGDISG-----TISGNTVSVS-----ATVD---L 1190
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         : ||||:| :::|||||| |
| 1191 ENAVINATSGTVNISTKTGDIKGGIESTSGNVNITASGNTLKVSNITGQDVTVTADAGAL 1250
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ----GTISGNTVNVTANAGDLTVGNGAEINATEGAAT 1248
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  LTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKAT 1308
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       SGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISK 1368
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              DGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFV 1428
717 KVNFKLKPNENMNTSKPLPIRFLANITATGG--GSVFFDIYANHSGRGAELKMSEINISN 774
                 GENERAL INFORMATION:
APPLICANT: LOOSMORE, Sheena M.
APPLICANT: LOOSMORE, Sheena M.
APPLICANT: Mang, Yan-Ping
APPLICANT: Klein, Michel H.
ITTLE OF INVENTION: Protective Recombinant Haemophilus Influenzae High
ITTLE OF INVENTION: Molecular Weight Proteins
FILE REFERENCE: 1038-861 MIS:jb
                                                           775 GANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGG
                                                                              835 NVTLGGQNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGEN
                                                                                                                                       ADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      EPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1551 EPNNAITVNTQNEFTTKPSSQVTISEGKACFSSGNGARVCTNVADDGQ 1598
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1191 TTKSGSKIEAKSGEANVTSATG------
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Sequence 73, Application US/09206942 Patent No. 6432669
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1213 ----TIG----
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 US-09-206-942-73
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1249
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1431
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1309
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1369
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1491
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1429
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 RESULT 10
                                                            δλ
                                                                                                                                                    q
                                                                                                                                                                                                            QQ
                                                                                                                      δ
                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                 ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                       ρp
                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               αq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Dp
```

us-10-092-880-4.rai

```
Local Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     linear
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       amino acid
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Arlington
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    STRANDEDNESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       TOPOLOGY:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      TIS-08-038-682-2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Matches 1047;
                                                                                                                                                                                                                                                                        US-08-038-682-2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δλ
                                                                                                                                                                                                       Dp
                                                                                                                                         QQ
                                                                                                                                                                         δ
                                                                            g
                                                                                                            ó
                                                                                                                                                                                                                         ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1223 VNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAG 1282
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1283 SINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGS 1342
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1163 KASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNT 1222
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        983 AEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLT 1042
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     662 VKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKTVNITASEKVTTTAGSTINATNG 721
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              923 FTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNND 982
                                                                                                                                                                                                                                                                                                                                         62 SRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDITSKGGNLTIYSGGWVDVHKNITLD 121
                                                                                                                                                                                                                                                                                                                                                                                      563 QGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLNII 622
                                                                                                                                                                                                                                                                                                                                                                                                     122 QGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLNII 181
                                                                                                                                                                                                                                                                                                                                                                                                                                                  623 SSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHDSHWNVSALNLETGANFTFIKYI 682
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        182 SSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHDSHWNVSALNLETGANFTFIKYI 241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   683 SSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFLANI 742
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    743 TATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATN 802
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 803 SNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGGQNSSSSITGNITIEKAANVTLE 862
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             863 ANNAPNOONIRDRVIKLGSLLVNGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGN 922
                                                                                                                                                                                                                                                       443 DNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELKTTLINTTISNYLKNAWTMNITA 502
                                                                                                                                                                                                                                                                                                                       503 SRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITSKGGNLTIYSGGWVDVHKNITLD 562
                                                                                                                                                                                                                             Gaps
                                                                                                                                                                                                                                                                              2 DDVTIEAEDPLRNNTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAMTMNITA 61
                                                                                                                                                                                                                           0
                                                                                                                                                                                        Ouery Match 69.7%; Score 5164; DB 4; Length 1036; Best Local Similarity 99.5%; Pred. No. 3.4e-286; Matches 1030; Conservative 2; Mismatches 3; Indels 0;
CURRENT APPLICATION NUMBER: US/09/206,942
CURRENT FILING DATE: 1998-12-08
EARLIER APPLICATION NUMBER: 09/167,568
EARLIER FILING DATE: 1998-10-07
NUMBER OF SEQ ID NOS: 95
                                                                                                                                             ) ORGANISM: Haemophilus influenzae US-09-206-942-73
                                                                                 SOFTWARE: Patentin Ver. 2.1
                                                                                                                 1036
                                                                                                SEQ ID NO 73
                                                                                                                 LENGTH:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Сp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ٥y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        рp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               οg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Dp.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δ
                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                          Db
                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                         Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                           δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
```

```
20;
                                      121 NSAVENRYTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         67.1%; Score 4967; DB 1; Length 1536;
hilarity 67.3%; Pred. No. 9.3e-275;
Conservative 146; Mismatches 264; Indels 98; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1 MUKIYRLKFSKRLMALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
APPLICANT: BARENKAMP, STEPHEN J
APPLICANT: ST. GEME III, JOSEPH W
TITLE OF INVENTION: HIGH MOLECULAR WEIGHT SURFACE PROTEINS
TITLE OF INVENTION: OF NON-TYPEABLE HAEMOPHILUS
NUMBER OF SEQUENCES: 8
CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                           ADDRESSEE: Shoemaker and Mattare, Ltd
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                    Sequence 2, Application US/08038682 Patent No. 5549897 GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ATTORNEY/AGENT INFORMATION:
NAME: BERKSTRESSER, JERRY W
REGISTRATION NUMBER: 22,651
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     REFERENCE/DOCKET NUMBER: 10:
TELECOMMUNICATION INFORMATION:
TELEPHONE: (703) 415-0810
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               INFORMATION FOR SEQ ID NO. 2: SEQUENCE CHARACTERISTICS: LENGTH: 1536 amino acids
                                                                                                                                                             1463 NGARVCTNVADDGQP 1477
                                                                                                                                                                                          1022 NGARVCTNVADDGQP 1036
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           single
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    MOLECULE TYPE: protein
```

Д	121	NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 18	80
ò	181	RNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGGKIT 2	4
Op	181	ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 2	4
ΟY	4	ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 3	0
qq	4	INPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 3	00
Oy Dp	301	LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 36 	09
Οy	361	3IQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQSGDIAKTGGFVET A	Ö
QQ	361		70
ò	421	EASDPKKNSEL 4	
ò	• 60	HULKITISNYI, KNAMITANITA SAYI TAURESINASIA AYI TAURESINASI SAYI TAURESINASI SAYI TAURESINASI SAYI TAURESINASI SAYI TAURESINASI SAYI TAURESINASI SAYI TAURESINASI SAYI TAURESIN	8 /
· qa	-		39 37
δλ	540	AFEGGNNKARDAANAKIVAQ 5	
qq	538	DDTRGANLTIYSGGWVDVHKNISLGAQGNINITAKQDIAFEKGSNQV1TGQ 5	
ογ	6	TITGEGKDERANNVSLNGTGKGLNIISSVNNLTHULSGTINISGNITINQTTRK 65	0.0
g	o,	IT-SGNQKGFRFNNVSLNGTGSGLQFTTKRTNKYAITNKFEGTLNISGKVNISMVLPK 64	6
Oy Db	651		98
Qy Dp	709	RFLANITATGGGSVFFDIYANHSGRGAE 76	
ô	9	KASEINISNGANETI NSHVEGENDAEVITAEN TASH SASANGARSVSGGSVDFTLLASSSNVQTPGVV 76	φ
전	من ز	SKYFNVSTGSSLRFKTSGSTKTGFSIEKDLTLATICATELOVEGTDGMIGKGIV 82	4 4
δλ	25	NISILGGNVTLGGQNSSSITGNITIEKAANVTLEANNAPNQONIRDRVIKLGSLLV 88.	
В	25	KNITFEGGNITFGSRKAVTELEGNVTINNANVTLIGSDEDNHQKPLTIKKDVIIN 88:	2
ογ	82	Т 94	4
Dp	83	LTAGGNIVNIAGNLTVESNANFKAITNFTFNVGGLFDNKGNSNISIAKGGARFKDID 94	7
ογ γ	45	RNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDK 10	04
<u>a</u> ,	4 3 5	NLSITTNSSSTYRTIISGNITNKNGDLNITNEGSDTEMQIGGDVSQKEGNLTISSDK 10	02
ò i	005	INITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLT 106	64
<u>a</u> :	ص ر ا	NITKQITIKAGVDGENSDSDATNNANLTIKTKELKLTQDLNISGFNKAEITAKDGSDLT 10	62
Š	065	IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTI 112	24
g .	063	NTNSAD-GTNAKKVTFNQVKDSKISADGHKVTLHSKVETSGSNNNTEDSSDNNAGLT	21
δ d	1125 1	VNKDITSLKTVNITA-SEKVTTTAGSTINATNGKASITTRT	0,
3 8	171	NNVIVNNNTISHKAVSLSATSGEITTKTGTTINATTGNVEITAQTGSILGGIESSSGS 118	31
à i	7/7	118   TITE   TIT	11
qq	1182 V	124	౼

```
20;
1182 VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1241
                       1422 GLNIISKNGINTVLLKGVKIDVKYIQPGIASVDEVIEAKRILEKVKDLSDEEREALAKLG 1481
                                                                                1242 ATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTGTLTTVA 1301
                                                                                                                                                              1302 GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN 1361
                                                                                                                                                                                      1362 GLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG 1421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Gaps
                                                                                                                                                                                                                                                                                                                                                  1422 VSAVREVEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           98;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Query Match
67.1%; Score 4967; DB 1; Length 1536;
Best Local Similarity 67.3%; Pred. No. 9.3e-275;
Matches 1047; Conservative 146; Mismatches 264; Indels 98,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              APPLICANT: Barenkamp, Stephen J
TITLE OF INVENTION: High Molecular Weight Surface Proteins
TITLE OF INVENTION: of No. 5603938-Typeable Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        NUMBER OF SEQUENCES: 8
CORRESPONDENCE ADDRESS:
ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SOFTWARE: Patentin Release #1.0, Version #1.30 CURRENT APPLICATION DATA: PAPLICATION NUMBER: US/08/302,832 FILING DATE: 16-SEP-1994 CLASSIFICATION: 435 PRIOR APPLICATION DATA:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   APPLICATION NUMBER: US pct/us93/02166
FILING DATE: 16-MAR-1993
ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1038-404
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    APPLICATION NUMBER: GB 9205704.1
FILING DATE: 16-MAR-1992
PRIOR APPLICATION DATA: US pct/us93/C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            COMPUTER READABLE FORM:
MBDIUM TYPE: Floppy disk
COMPUTER: IBM PC compatible
OPERATING SYSTEM: PC-DOS/MS-DOS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Sequence 2, Application US/08302832; Patent No. 5603938
GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
REFERENCE/DOCKET NUMBER: 103
TELECOMMUNICATION INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ; TOPOLOGY: linear; MOLECULE TYPE: DNA (genomic) US-08-302-832-2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                TELEPHONE: (703) 415-0810
TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 2:
SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1536 amino acids
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              single
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          COUNTRY: U.S.A.
ZIP: 22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        amino acid
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   CITY: Arlington
STATE: Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     STRANDEDNESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              TELEPHONE:
                                                                                                                                                                                                                                                                                                                                                                                                                              RESULT 12
US-08-302-832-2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  LENGTH:
                                                                                                                                                                òγ
                                                                                                                                                                                                     Db
                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                              ŏ
                                                                                                                                                                                                                                                                                                                            δ
```

Oy Dh		MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKFARMKVRHLALKPLSAMLLSLGVT 60 	0 0
Qy Db		OSVLASGLQCMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 1 	20
Oy Db	121	*NGITIGKDAIINTNGFTASTLDISNENIK 1:	90
Qy	181	ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 24 	40
Qy Db		INPTITYSIAAPENEAVNIGDIPAKGGNINVRAATIRNOGKLSADSVSKDKSGNIV 3	00
QY Db	301	EGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 3	90
QY	361	NAQGSGDIAKTGGFVET 4	20
Qy		1. SLEIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTG-EASDPKKNSEL 4	79
Qy Db	7	TTLTNTTISNYLKNAWTMNITASRKI         :    TTLTNTTLESILKKGTFVNITANQRI	39
Qy Dp		SKGGNLTIYSGGWUDVHKNITLD-QGFLNITA-ASVAFEGGNNKARDAANAKIVAQ 5	93
Qy	594	GTVTITGEGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINGTTRK 6   :  :  :  :  :  :   GTIT-SGNQKGFRFNNVSLNGTGSGLQFTTKRTNKYAITNKFEGTLNISGKVNISMVLPK 6	50
Qy	5 5	NTS-YWQTSHDSHWNVSALNLETGANFTF-IK                           NESGYDKFKGRTYWNLTSLNVSESGEFNLTID	90,
Qy	709	SFULKEGAKVNFKLKPNENMNTSKPLP-IRFLANITATGGGSVFFDIYANHSGRGAE	
QY	765	LKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAIN   :	824
QY	2 2	STYNISILGGNVTLGGQNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLV :	884
Oy Dp	885	NGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITGGVVKLGNVT :   :   :   :           :   :   :   :	944 942
Qy	945	NDCDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDK   : :  ::  :   :	1004
QY		INITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDI 	1064 1062

```
1362 GLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG 1421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1182 VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1302 GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN 1361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1182 VTLTATEGALAVSNISGNTVTVTANSGALTTLAGSTIKGTESVTTSSQSGDIGGTISGGT 1241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1242 ATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVA 1301
                                        1063 IGNTNSAD-GTNAKKVTFNQVKDSKISADGHKVTLHSKVETSGSNNNTEDSSDNNAGLTI 1121
                                                                                                                                                       1125 TAKNVEVNKDITSLKTVNITA-SEKVTTTAGSTINATNGKASITTKT------ 1170
                                                                                                                                                                                               -----GDISGTISGNT 1181
1065 IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTI 1124
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       APPLICANT: BARENKAMP, STEPHEN J
APPLICANT: ST. GEME III, JOSEPH W
APPLICANT: ST. GEME III, JOSEPH W
APPLICANT: ST. GEME III, JOSEPH W
APPLICANT: ST. GEME III, JOSEPH W
APPLICANT: ST. GEME III, JOSEPH W
APPLICANT: ST. GEME III, JOSEPH W
APPLICANT: ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME III, ST. GEME IIII, ST. GE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ADDRESSEE: Shoemaker and Mattare, Ltd
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            COMPUTER: IBM PC compatible
OPERATING SYSTEM: PC-DOS/MS-DOS
SOFTWARE: Patentin Release #1.0, Version #1.25
SURRENT APPLICATION DATA:
APPLICATION NUMBER: US/08/530,198
FILING DATE: 13-DBC-1995
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 JWB-1186
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ATTORNEY AGENT INFORMATION:
NAME: BERKSTRESSER, JERRY W
REGISTRATION NUMBER: 2,651
FRETERENCE/COCKET NUMBER: JWB-1
TELECOMMUNICATION: INFORMATION:
TELEPHONE: (703) 415-0813
INFORMATION FOR SEQ. ID NO: 2:
SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ; Sequence 2, Application US/08530198; Patent No. 5869065; GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                       1171 ------
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1536 amino acids
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     COMPUTER READABLE FORM:
MEDIUM TYPE: Floppy disk
COMPUTER: IBM PC compatib
OPERATING SYSTEM: PC-DOS,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    single
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               NUMBER OF SEQUENCES: 8
CORRESPONDENCE ADDRESS:
ADDRESSEE: Shoemaker
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            TYPE: amino acid
STRANDEDNESS: Sir
TOPOLOGY: linear
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  CITY: Arlington
STATE: Virginia
COUNTRY: U.S.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          CLASSIFICATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        LENGIH:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       08-530-198-2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   STREET:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Dβ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             QΥ
                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                              QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Ω
```

```
20;
                                                                                                                                                                                                                                                                                                                                      SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                          121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTG-EASDPKKNSEL 479
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           945 NDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAELQIGGNISQKEGNLTISSDK 1004
                                                                                                                                                                                                               1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                               480 KTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDIT 539
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          540 ----SKGGNLTIYSGGWVDVHKNITLD-QGFLNITA-ASVAFEGGNNKARDAANAKIVAQ 593
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              538 TGDDTRGANLTIYSGGWVDVHKNISLGAQGNINITARQDIAFEKGSNQV-----ITGQ 590
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               GTVTITGEGKDFRANNVSLNGTGKGLNIISSVNN---LTHNLSGTINISGNITINQTTRK 650
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         651 NTS-YWQTSHDSHWNVSALNLETGANFTF-IKYISSNSKGLTTQYRSSAGVNFNGVNGNM 708
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               709 SFNLKEGAKVNFKLKPNENMNTSKPLP-IRFLANITATGGGSVFFDIYANHSG---RGAE 764
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      707 TFNVERNARVNFDIKAPIGINKYSSLNYASFNGNISVSGGGSVDFTLLASSSNVQTPGVV 766
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       765 LKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAIN 824
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     : ||: |||:|| :::|| ||:|| ||:|| ||:|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::|| ::||
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVT 944
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 STYNISILGGNVTLGGQNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLV 884
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 650 NESGYDKFKGRIYWNLTSLNVSESGEFNLTIDSRGSDSAGTLTQPYNLNGISF---NKDT
                                                                                                                                                                 98;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Ouery Match 67.1%; Score 4967; DB 2; Length 1536; Best Local Similarity 67.3%; Pred. No. 9.3e-275; Matches 1047; Conservative 146; Mismatches 264; Indels 98
         protein
MOLECULE TYPE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ::
=
::
   ; MOLECULE TI
US-08-530-198-2
                                                                                                                                                                                                                                                                                                                                          61
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  825
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    883
                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                        δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         В
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Ωp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                pp
```

```
943 NSKNLSITTNSSSTYRTIISGNITNKNGDLNITNEGSDTEMQIGGDVSQKEGNLTISSDK 1002
                                   1005 INITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLT 1064
                                                       1065 IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTI 1124
                                                                                                                             1125 TAKNVEVNKDITSLKTVNITA-SEKVTTTAGSTINATNGKASITTKT------- 1170
                                                                                                                                                                                               1171 -----GDISGTISGNT 1181
                                                                                                                                                                                                                                                                                                                1182 VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1241
                                                                                                                                                                                                                                                                               1182 VTLTATEGALAVSNISGNTVTVTANSGALTTLAGSTIKGTESVTTSSQSGDIGGTISGGT 1241
                                                                                                                                                                                                                                                                                                                                    1242 ategaatltatgntltteagssitstkgqvdllaqngsiagsinaanvtlnttgtlttva 1301
                                                                                                                                                                                                                                                                                                                                                                                                         1302 GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN 1361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1422 GLNIISKNGINTVLLKGVKIDVKYIQPGIASVDEVIEAKRILEKVKDLSDEEREALAKLG 1481
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1362 GLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG 1421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1422 VSAVREVEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    TITLE OF INVENTION: High Molecular Weight Surface Proteins TITLE OF INVENTION: Of NO. 5876733-Typeable Haemophilus NUMBER OF SEQUENCES: 8 CORRESPONDENCE ADDRESS:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza;
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     COMPUTER: IBM PC compatible
OPERATING SYSTEM: PC-DOS/MS-DOS
SOFTWARE: Patentin Release #1.0, Version #1.30
APPLICATION NUMBER: US/08/469,880
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     US PCT/US93/02166
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            JMBER: US/08/469,880
06-JUN-1995
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       US 08/302,832
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Barenkamp, Stephen J.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Sequence 2, Application US/08469880 Patent No. 5876733
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                FILING DATE: 16 MAR-1992
PRIOR APPLICATION DATA:
APPLICATION NUMBER: US PC
FILING DATE: 16-MAR-1993
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Floppy disk
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PRIOR APPLICATION DATA:
APPLICATION NUMBER: G
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    COMPUTER READABLE FORM:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PRIOR APPLICATION DATA: APPLICATION NUMBER:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GENERAL INFORMATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                CITY: Arlington
STATE: Virginia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 COUNTRY: U.S.A. ZIP: 22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CLASSIFICATION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          MEDIUM TYPE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              FILING DATE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ADDRESSEE:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         APPLICANT:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       US-08-469-880-2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RESULT 14
                                                                      qq
                                    ò
                                                                                                         ò
                                                                                                                                        qq
                                                                                                                                                                                                           pp
                                                                                                                                                                           ò
                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                      ô
                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
```

```
20;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           651 NTS-YWQTSHDSHWNVSALNLETGANFTF-IKYISSNSKGLTTQYRSSAGVNFNGVNGNM 708
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           650 NESCYDKFKGRTYWNLTSLNVSESGEFNLTIDSRGSDSAGTLTQPYNLNGISF---NKDT 706
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     421 SGHDLFIKDNAIVDAKEWLLDFDNVSINAETAGRSNTSEDDEY-TGSGNSASTFKRNKE- 478
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             480 KTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDIT 539
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      540 ----SKGGNLTIYSGGWVDVHKNITLD-QGFLNITA-ASVAFEGGNNKARDAANAKIVAQ 593
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             594 GTVTITGEGKDFRANNVSLNGTGKGLNIISSVNN---LTHNLSGTINISGNITINQTTRK 650
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 709 SFNLKEGAKVNFKLKPNENMNTSKPLP-IRFLANITATGGGSVFFDIYANHSG---RGAE 764
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     SCHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTG-EASDPKKNSEL 479
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                         61 SIPOSVLASGLOGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                               98; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                          1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                    1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                           67.1%; Score 4967; DB 2; Length 1536;
nilarity 67.3%; Pred. No. 9.3e-275;
Conservative 146; Mismatches 264; Indels 98.
                                                                         1038-516 MIS:vg
                                REGISTATION UNDER: 22.651
REGISTATION UNDER: 22.651
REPERENCE/DOCKET MUMBER: 1038
TELECOMMUNICATION INFORMATION:
TELEFONE: (703) 415-0810
TELEFONE: (703) 415-0810
INFORMATION FOR SEQ ID NO: 2:
SEQUENCE CHARACTERISTICS:
LENGTH: 1536 amino acids
TYPE: amino acids
                                                                                                                                                                                                                                                   ; MOLECULE TYPE: DNA (genomic) US-08-469-880-2
FILING DATE: 16-SEP-1994 ATTORNEY/AGENT INFORMATION:
                                                                                                                                                                                                                         single
                                                                                                                                                                                                                                            linear
                                                                                                                                                                                                                                                                                                                              3est Local Similarity
Matches 1047; Conserv
                                                                                                                                                                                                                       STRANDEDNESS:
                                                                                                                                                                                                                                                                                                                   Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Óγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ВÞ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ŏ
                                                                                                                                                                                                                                                                                                                                                                                          ò
```

```
1242 ATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVA 1301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1302 GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN 1361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1362 GLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG 1421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1125 TAKNVEVNKDITSLKTVNITA-SEKVTTTAGSTINATNGKASITTKT------- 1170
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1182 VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1241
                                                                                                                                                                                                                                                                                          1181 1181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1182 VTLTATEGALAVSNISGNTVTVTANSGALTTLAGSTIKGTESVTTSSQSGDIGGTISGGT 1241
                                                                                                                                                                                                                          1065 IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTI 1124
                                                                                                                                                                                                     945 NDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDK 1004
                                                                                                                                                                                                                                                                      1005 INITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLT 1064
                                                                                                                                                                 883 SGNLTAGGNIVNIAGNLTVESNANFKAITNFTFNVGGLFDNKGNSNISIAKGGARFKDID 942
                     825 AKKNITFEGGNITFGSRKAVTEIEGNVTINNNANVTLIGSDFDNHO--KPLTIKKDVIIN 882
                                                                                                                                    885 NGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVT 944
765 LKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAIN 824
                                                                 825 STYNISILGGNVTLGGQNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLV 884
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1422 VSAVRFVEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1482 VSAVRETEPNNTITVDTQNEFATRPLSRIVISEGRACFSNSDGATVCVNIADNGR 1536
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               TITLE OF INVENTION: High Molecular Weight Surface Proteins TITLE OF INVENTION: of No. 5928651-Typeable Haemophilus NUMBER OF SEQUENCES: 10 CORRESPONDENCE ADDRESS: ADDRESSE: Shoemarca
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ADDRESSEE: Shoemaker and Mattare, Ltd.
STREET: 2001 Jefferson Davis Hwy., 1203 Crystal Plaza
STREET: Bldg. 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Sequence 2, Application US/08728470 Patent No. 5928651
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   IBM PC compatible
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Floppy disk
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              COMPUTER READABLE FORM: MEDIUM TYPE: Floppy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GENERAL INFORMATION:
APPLICANT: Barenka
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               CITY: Arlington STATE: Viria
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            COUNTRY: U.S.A.
ZIP: 22202-0286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   COMPUTER:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     US-08-728-470-2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       RESULT 15
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Оp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Db
                                                                                                                                                                                                                                                                                                                                                                          Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Ω
                                       ρp
                                                                                                      qq
                                                                                                                                        ò
                                                                                                                                                                       qq
                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                        Dp
                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                             οy
                                                                                                                                                                                                                                                                                                                                                                                                              οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                        óλ
```

```
20;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                          98; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTG-EASDPKKNSEL 479
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               KTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDIT 539
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ----SKGGNLTIYSGGWVDVHKNITLD-QGFLNITA-ASVAFEGGNNKARDAANAKIVAQ 593
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Length 1536;
                                                                                                                                                                                                                                                                                                                                                                                                                                                         Indels
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ::
::
::
            PatentIn Release #1.0, Version #1.30
                                                                                                                                                                                                                                                                                                                                                                                                                       67.1%; Score 4967; DB 2;
ilarity 67.3%; Pred. No. 9.3e-275;
Conservative 146; Mismatches 264;
                                                                                                     FILING DATE: 16-MAR-1993
PRIOR APPLICATION DATA:
APPLICATION NUMBER: US PCT/US93/02166
FILING DATE: 16-MAR-1993
PRIOR APPLICATION DATA:
APPLICATION NUMBER: GB 9205704.1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        CLASSIFICATION: 424
PRIOR APPLICATION DATA:
APPLICATION NUMBER: US 08/302,832
                                           US/08/728,470
                                                                                                                                                                                                                                                 1038-633
OPERATING SYSTEM: PC-DOS/MS-DOS
                                                                                                                                                                                   FILING DATE: 16-MAR-1992
ATTORNEY/AGENT INFORMATION:
NAME: Berkstresser, Jerry W
REGISTRATION NUMBER: 22,651
                                                                                                                                                                                                                                       REFERENCE/DOCKET NUMBER: 103
TELECOMMUNICATION INFORMATION:
TELEPHONE: (703) 415-0810
TELEFAX: (703) 415-0813
INFORMATION FOR SEQ ID NO: 2:
                                                                                                                                                                                                                                                                                                                              1536 amino acids
                      CURRENT APPLICATION DATA: APPLICATION NUMBER: US
                                                                                                                                                                                                                                                                                                               SEQUENCE CHARACTERISTICS:
                                                                                                                                                                                                                                                                                                                                          amino acid
                                                                                                                                                                                                                                                                                                                                                                     linear
                                                                                                                                                                                                                                                                                                                                                                                                                       Query Match
Best Local Similarity
                                                                                                                                                                                                                                                                                                                                                     STRANDEDNESS:
                                                     FILING DATE:
                                                                                                                                                                                                                                                                                                                                                                                 ; MOLECULE TYPE:
US-08-728-470-2
                                                                                                                                                                                                                                                                                                                                                                  TOPOLOGY:
                                                                                                                                                                                                                                                                                                                             LENGTH:
                                                                                                                                                                                                                                                                                                                                                                                                                                                    Matches 1047;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                19
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    480
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          540
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            P
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ð
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          òχ
```

```
538 TGDDTRGANLTIYSGGWVDVHKNISLGAQGNINITAKQDIAFEKGSNQV-----ITGQ 590
                                                                  594 GTVTITGEGKDFRANNVSLNGTGKGLNIISSVNN---LTHNLSGTINISGNITINQTTRK 650
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          945 NDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDK 1004
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1065 IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTI 1124
                                                                                                         651 NTS-YWQTSHDSHWNVSALNLETGANFTF-IKYISSNSKGLTTQYRSSAGVNFNGVNGNM 708
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           650 NESGYDKFKGRIYWNLISLNVSESGEFNLTIDSRGSDSAGTLTQPYNLNGISF---NKDT 706
                                                                                                                                                                                                                                                                                                                                  709 SFNLKEGAKVNFKLKPNENMNTSKPLP-IRFLANITATGGGSVFFDIYANHSG---RGAE 764
                                                                                                                                                                                                                                                                                                                                                                            1182 VTLTATEGALAVSNISGNTVTVTANSGALTTLAGSTIKGTESVTTSSQSGDIGGTISGGT 1241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1182 VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        : ||: |||:| || :: : | ||:|| ||:|| ||:|| ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||: ||
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        -----GDISGTISGNT 1181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1242 ategaatltatgntltteagssitstkgqvdllaqngsiagsinaanvtlnttgtlttva 1301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1302 GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN 1361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1362 GLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG 1421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  STYNISILGGNVTLGGQNSSSSITGNITLEKAANVTLEANNAPNQQNIRDRVIKLGSLLV 884
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        885 NGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVT 944
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1362 GSNINATSGTLVINAKDAELNGAALGNHTVYNATNANGSGSVIATTSSRVNITGDLLTIN 1421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           LKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1005 INITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1422 VSAVREVEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1125 TAKNVEVNKDITSLKTVNITA-SEKVTTTAGSTINATNGKASITTKT----
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             825
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1171
                                                                  ò
                                                                                                                                 q
                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                    δ
                                                                                                                                                                                                                                                                   q
                                                                                                                                                                                                                                                                                                                                      δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           음
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   οy
```

Search completed: March 24, 2003, 15:24:58 Job time : 28 secs

```
March 24, 2003, 15:21:24 ; Search time 18 Seconds
    (without alignments)
    3403.363 Million cell updates/sec
                                                                                                                                                                                                                                         Title: US-10-092-880-4
Perfect score: 7407
Sequence: 1 MNKIYRLKFSKRLNALVAVS.......CFSSGNGARVCINVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   112892
GenCore version 5.1.4\_p5\_4578 Copyright (c) 1993 - 2003 Compugen Ltd.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Total number of hits satisfying chosen parameters:
                                                                                                                                                                                                                                                                                                                                                                                                                112892 segs, 41476328 residues
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries
                                                                                                OM protein - protein search, using sw model
                                                                                                                                                                                                                                                                                                                                               BLOSUM62
Gapop 10.0 , Gapext 0.5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Minimum DB seq length: 0
Maximum DB seq length: 200000000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           SwissProt_40:*
                                                                                                                                                                                                                                                                                                                                               Scoring table:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Database :
                                                                                                                                                                                                                                                                                                                                                                                                                         Searched:
```

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

## SUMMARIES

	Description	P16466 proteus mir									es	н	Sa	ч	S	r outer					escherichi	_		_	_			_	14914	828 caulobacte	208 e	Q02470 lactobacill	293 1	P15292 lactococcus
COLUMNIA	ID	HLYA PROMI	YDBA_ECOLI	OMPA_RICRI	HXA3_HAEIN	HXA2 HAEIN	OMPB_RICJA	OMPA_RICCN	FHAB_BORPE	HXA1_HAEIN	YDEK_ECOLI	OMPB_RICRI	BIGA_SALTY	OMPB_RICCN	HLYA_SERMA	OMPB_RICPR	OMPB_RICTY	YEEJ_ECO57	AIDA_ECOLI	YEEJ_ECOLI	YPJA_ECOLI	PMPB_CHLTR	IGAO_HAEIN	PMPB_CHLMU	CBPA_CLOCL	IGA2_HAEIN	PM20_CHLPN	PMPC_CHLTR	120K_RICRI	SLAP_CAUCR	YFAL_ECOLI	P2P_LACPA	P2P_LACLC	P3P_LACLC
	DB	į.													1																	Н		
	Length	1577	2003	2249	917	928	1656	2021	3591	905	1325	1654	1953	1655	1608	1643	1645	2660	1286	2358	1569	1754	1694	1672	1848	1702	1723	1770	1300	1025	1250	1902	1902	1902
æ	Query Match	7.5	7.0															5.5					4.8	4.8	4.8	4.8	4.7	4.6	4.5	4.5	4.4	4.3	4.3	
	Score	555.5	521	511	509	486.5	476.5	475.5	469.5	466	441.5	429.5	429.5	428	425	419	415	406		385.5			357	355	354	352	346.5	m	34	333.5	24	'n	319	318.5
	Result No.		10	1 ~	4	ינר	9	7	· œ	6	10	11	12	1.5	14	15	16	17	18	119	20	21	22	23	24	25	26	27	28	29	30	31	32	33

Query Match
7.5%; Score 555.5; DB 1; Length 1577;
Best Local Similarity 20.7%; Pred. No. 1.1e-15;
Matches 361; Conservative 257; Mismatches 606; Indels 523; Gaps

40 MKVRHLALKPLSAMLLSLGVTSIPQSVLASGL-----QGMDVV---HGTATMQV--DGN 88 

Qγ

04823 helicobacte 04823 helicobacte 09nzw4 homo sapien 09nzw4 homo sapien 05127 lactococcus 05827 campylobact 045785 haemophilus 045782 haemophilus 045836 t amylopul 038394 bacteriopha 045385 haemophilus 045385 haemophilus		· (d	n; Enterobacteriaceae;		Unploff T.S., Welch R.A., of the Proteus mirabilis calcium-independent "Nucleotide sequencing of the Proteus mirabilis calcium-independent hemolysin genes (thmA and hpmB) reveals sequence similarity with the Serratia marcescens hemolysin genes (shlA and shlB).";  J. Bacteriol. 172:1206-1216(1990).	FUNCTION: BACTERIAL HEMOLYSINS ARE EXOTOXINS THAT ATTACK BLOOD CELL. MEMBRANES AND CAUSE CELL RUPTURE BY MECHANISMS NOT CLEARLY DEFINED.  FUNCTION: CELL-BOUND HEMOLYSIN, WHICH RELEASES HEME-IRON FROM ERVORTOR BY INTERACTION WITH THE ERYTHROCYTE MEMBRANE. HPMA	IIC DOMAINS IN SHLA AND HPMA (SHLA).	through a collab the EMBL outst to restrictions content is in by and for com www.isb-sib.ch/an	:924B2D9 CRC64;
VG37_BPT2 VAC3_HELPY DSPP_HUMAN B1P_LACLC SIAP_CAMFE ICAM_FE ICAM_HAEIN	ALIGNMENTS	PRT; 1577 AA. ed) sequence update)	Hemolysin precursor. HPWA. HPWA. mirabilis. Bacteria; Proteobacteria; gamma subdivision; ProteuxID-584;	QUENCE OF 30-43.	the Proteus miral pumb) reveals sersin genes (shlA sersin genes (shlA sersin genes (shlA sersin genes (shlA sersin genes sersion	MOLYSINS ARE EXO SE CELL RUPTURE EMOLYSIN, WHICH CTION WITH THE E	REQUIRES HPMB FUNCTION. SUBCELLULAR LOCATION: Outer membrane. MISCELLANEOUS: THE CONSERVED AMPHIPATHIC DOMAINS MAY BE RESPONSIBLE FOR PORE FORMATION. SIMILARITY: TO S.MARCESCENS HEMOLYSIN (SHLA).	This SWISS-PROT entry is copyright. It is produced between the Swiss Institute of Bioinformatics and the European Bloinformatics Institute. There are nuse by non-profit institutions as long as its candified and this statement is not removed. Usage entities requires a license agreement (See http://vor send an email to license@isb_sib.ch).	 mbrane; Signal. HEMOLYSIN. 9 MW; 175975EOC924B2D9
4.3 1341 1 4.2 1902 1 4.2 1902 1 4.2 1902 1 4.0 1849 1 4.0 1861 1 3.9 1524 1 3.8 1176 1		STANDARD; (Rel. 15, Created) (Rel. 15, Last seq	cursor. bilis bteobacteria; g	[1] STRAIN-ISOLATE 477-12; MEDLINE-90170827; Pubmed=2407716;	Uphoff T.S., Welch R.A.; "Nucleotide sequencing of themolysin genes (hpmA and Serratia marcescens hemoly: J. Bacteriol. 172:1206-1218	: BACTERIAL HER BRANES AND CAUS : CELL-BOUND HI YTES BY INTERA	REQUIRES HPMB FUNCTION. SUBCELLULAR LOCATION: Outer membrane MISCELLANEOUS: THE CONSERVED AMPHIPA MAY BE RESPONSIBLE FOR PORE FORMATIO SIMILARITY: TO S.MARCESCENS HEMOLYSI	This SWISS-PROT entry is copyright. It is between the Swiss Institute of Bioinform the Buropean Bloinformatics Institute. Use by non-profit institutions as low modified and this statement is not removentiales requires a license agreement (Swissend an email to license@lsb-sib.ch).	6; AAA25657.1; ; A35140 TOXIn; Outer membrane; 1 29 HEMO 1577 AA; 165869 MW;
34 317 35 315.5 36 314 37 314 38 318 40 297 40 297 41 296 43 2904 43 298 44 288		ECMI LYA_PROMI 16466; 1-AUG-1990 1-AUG-1990	Hemolysin precursor HPMA. Proteus mirabilis. Bacteria; Proteobac Proteus. NCBL_TaxID=584;	SEQUENCE FROM STRAIN=ISO1a MEDLINE=9017	Uphoff T.S., W "Nucleotide se hemolysin gene Serratia marce J. Bacteriol.	-i- FUNCTION CELL MEM DEFINED. -i- FUNCTION ERYTHROC	REQUIRES -!- SUBCELLU -!- MISCELLA MAY BE R -!- SIMILARI	This SWISS-PR between the the European use by non- modified and entities requ	EMBL; M30186; AAA256 PIR; A35140; A35140 Hemolyais; Toxin; O SIGNAL 30 11 SEQUENCE 1577 AA;
m m m m m <b>m च च च च च</b>		HEYA_P HEYA_P ID H AC P DT 0	OCC OCC OCC	R R P R X	RA RT RI	88888	88888	888888888	CC DR DR FT FT SQ

Qy Db	89	9 KTIIRNSVDAIINWKQFNI	
Qy Db	130	SNOISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIKARNFTF 18	
Qy Dp	187	EQTKDKALAEIVHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGGKITI   :     ::    ::	
Qγ	242	SDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIR 28	
QQ	222	SQHFDILSSQKPVSALDSYFFGSMQSGRIR	
Qy Dp	282	2 NQGKLSADSVSKDKSGNIVLSAKEGEAEIGGVISAQNQQAKGGK 325	
δy	326	LMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKGSTINVSG 38	
QQ	342	! II :	
γο 4 Ε	384	KEKGGFAIVWGDIALIDGNINAQGSGDIAKTG	
3 8	,	ANNALLIAINGDVILLDAAKINAGNNLA	
d D	416	GSWSNSHQTETLKASELTAGKDLGLDAQGSITAQGAKLHANENVLVNAKDNINL 510	
ογ	448	NAEDPLENNTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLT   :   :	
Д	511		
Qy Dp	508	VNSSINIGSNSHLILHSKGGRGGGVQIDGDITSKGGNLTIYSGGWUDVH 556 : :  : :   : :   : :   LAADNNVNITGSQVKGNQGAFVKTTQGDVVIDNALSETISKIDBRTGTAFNITKSSH 615	
οy	557	KNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAOGTVTITGEGKDFRANNVSI.NGTG 61	
qq	919		
οy	617	KG	
qq	648		
Oy Dp	647	TTRKNTSYWQTSHDSHWNVSALNLETGANFTF	
οy	687	GNMSFNLKEGAKVNFKLKPNENMNTSKPLPTRFLA	
qq	763	 DKQHTQTEVTKNRGSQTEVAG	
δy	741		
qq	816	DLTITANKDLLHEGASHHVEGRYQESGENIQHLAVNDSETSKTDSLNVGIDVGVN 870	
· À	800	ATNSNFSLRQTKDDFYDGYGROUTE 838	
q		LDYSGVT-KPVKKAIEDGVNTTKPGNNTDLTKKVTARDAIANLANLSNLETPNVGVEVGI 929	
χ̈́	839	GGQNSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLG-SLLVN 885	
අ	930	KGGGSQQSQTDSQAVSTSINAGKIDIDSNNKLHDQGTHYQSTQEGISLTANTHTSEATLD 989	
χ̈	886	GSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGT 928	
g .	90	KHQTTFHETKGGGQIGVSTKTGSDITVAIKGEGQTTDNALMETKAKGSQFTSNGD 1044	
ζ	929	AEINITQGVVKLGNVTNDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEI 985	

```
986 QIGGNISQKEGNLTISSD------KINITKQITIKKGIDGEDSSSDATSNANLTIKT 1036
                                                                      1037 KELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEA---KTVTFNNVKDSKISAD 1093
                                                                                                                                  1094 GHNVTLNS------KVKTSSSNGGRESNSDNDT--GLTITAKNVEVNKDITSL---- 1138
                                                                                                                                                                                               1203 G----LGSAQFAIGKQDEKSVSREGGTINNSGNLTINGNSVHLQGAQVNSKDTQLTSQSG 1258
                                                                                                                                                                                                                                          1139 ----KTVNITASEKVTTTAGSTINATNGKASITT----KT 1170
                                                                                                                                                                                                                                                                                                       1171 GDISGTISGNTVSVSATVDLTTKSGSKIEAKSGEANVT--SATGTIGGTIS----- 1219
                                                                                                                                                                                                                                                                       1259 DIEITSAOSTDYKNNWGTDIGFNGKKTNNTPKEVTEEKPATSIHNIGGKLLVNVEDOQKT 1318
                                                                                                                                                                                                                                                                                                                            1475 -----HVDNDAVTKTT------SLTSNNDLSLNVNGS-TKLTGAEIVSQQGQ--V 1515
                                                                                                                                                                                                                                                                                                                                                                       1220 ------GNTVNVTANAGDL-----TVGNGAEINATEGAATLTATGN 1254
                                                                                                                                                                                                                                                                                                                                                                                                    1369 HVTVGVNVGYNHTNDPKSSQVNKTAKAGGSLLEKTIKDTIDSGIKSSTDAISDKYNSLSS 1428
                                                                                                                                                                                                                                                                                                                                                                                                                                    1255 TLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVI 1314
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1315 NAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTV 1374
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1375 RLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSA-VRFVEPNNT 1433
                                                                                                                                                                                                                                                                                                                                                                                                                                                              1516 DLGGSSSVKLENIE-----GHHYEAGADLDLKSSVVD-----LAKQLVGGDISFKSPVKT 1564
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   MEDLINE-97251357; Pubmed-9097039;
Aiba H., Baba T., Fujita K., Hayashi K., Inada T., Isono K., Itoh T.,
Kasai H., Kashimoto K., Kimura S., Kitakawa M., Kitagawa M.,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           SEQUENCE FROM N.A.
SEQUENCE FROM N.A.
STATAN-K12 / MG1655,
STRAN-K12 / MG1655,
STRAN-K12 / MG1655,
STRAN-K12 / MG1655,
Blattner F.R., Plunkett G. III, Bloch C.A., Perna N.T., Burland V.,
Riley M., Collado-Vides J., Glasner J.D., Rode C.K., Mayhew G.F.,
Gregor J., Davis N.W., Kirkpatrick H.A., Goeden M.A., Rose D.J.,
Mau B., Shao Y.;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Bacteria; Proteobacteria; gamma subdivision; Enterobacteriaceae;
Escherichia.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        "The complete genome sequence of Escherichia coli K-12.", Science 277:1453-1474(1997).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1434 -ITVNTQ 1439
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        [2]
SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1565 NETVNTK 1571
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Escherichia coli
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               NCBI_TaxID=562;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          STRAIN=K12;
                                                                            qq
                                                                                                                                                                           δ
                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                         qα
                                                                                                                                                                                                                                                                                                                                                                                                      Q
                                                                                                                                                                                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
```

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bioinformatics and the EMBL Gutstation the European Bioinformatics Institute. There are no restrictions on its use by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial entities requires a license agreement (See http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      358 -RGEGKNGIQLAKKTSLEKGSTIN------VSGKEKGGFAIVWGDIALIDGNI 403
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  398 VNNEGESAI----TNGGTGTQINGDDATANNNGKTTVDGKDSTGTEIAGNNGKVIQ--- 449
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     404 NAQGSGDIAKTGGFVETSGHDLFIK-DNAIVDAKEWLLDFD----NVSINAEDPLFNNTG 458
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               450 ----DGDLDVSGG-----GHGIDITGDSATVDNKGTMTVTDPESIGIQIDGDQAIVNNEG 500
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 459 INDEFPTGTG----EASDPKKNSELKTTL----TNTTISNYLKNAWTMNITASRKLTVNS 510
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KTI-IRNSVDAIINWKQFNIDQNE--MVQFLQENNNSAVFNR---VTSNQISQLKGILDS 142
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           201 GLITVGKDGS---VNLIGGKVKNEGVISVNGGSISL-LAGQKITISDIINPTITYSIAAP 256
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             236 -----GKDSTGTEINGNNGKVIQDGDLDVSGGGHGIDITGDSATVDNKGTWTVT----DP 286
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       287 ESMGIQIDGDKAIVNNEGESTITNGGTGTQINGDDATANNNGKTTVDGKDSTGTEINGNN 346
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Query Match 7.0%; Score 521; DB 1; Length 2003; Best Local Similarity 21.7%; Pred. No. 3.6e-14; Matches 388; Conservative 229; Mismatches 625; Indels 542; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               143 NGQVFLINPNG--ITIGKDAIINTNGFTASTLDISNENIKARNFTFEQTKDKALAEIVNH 200
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           257 ENEAVNL-GD------IFAKGG---NINVRAATIRNQGKLSA---DSVSKDKSGNI 299
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         300 VLSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDE-- 357
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      347 GKVIQDGDLDVSG-----GGHGIDITGDSATVDNKGTMTVTDPESIGIQVDGDQAV 397
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               153 KTLTIRDSV-----FTYTENADGTISLQDSNGRKATINLWQIDEANNTVALEGVSAD 204
Makino K., Miki T., Mizobuchi K., Mori H., Mori T., Motomura K., Nakade S., Nakamura Y., Nakaminot H., Nishio Y., Oshima T., Saito N., Sampei G., Seki Y., Sivasundaram S., Tagami H., Takeda J., Takeuchi Y., Sivasundaram S., Tagami H., Takeuchi Y., Wada C., Yamamoto Y., Horiuchi T., Takeuchi Y., Wada C., Yamamoto Y., Horiuchi T., Takeuchi Y., Mele Escherichia coli K.12 genome and 570-kb DNA sequence Cascherichia coli K.12 genome orresponding to the 28.0-40.1 min region on the linkage map.";
                                                                                                                                                                                                                                                              MOSZET I., Glaser P., Danchin A.;

Multiple IS insertion sequences near the replication terminus in Escherichia coli K.12."

Biochimie 73:1361-1374(1991).

-!- SIMILARITY: TO S.TYPHIMURIUM ORF NEAR CYSG (AC P25928).

-!- CAUTION: THIS IS A CONCEPTUAL TRANSLATION; THE GENE CODING FOR THIS PROTEIN IS INTERRUPTED BY A HYBRID IS2D/IS30C ELEMENT BETWEEN AMINO ACIDS 839 AND 840.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    2003 AA; 205949 MW; B83A12C8B53220EE CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Complete proteome. 9 I -> V (IN REF. 2). 5 I -> V (IN REF. 2).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              EMBL; AE000237; AAC74483.1; ALT_SEQ.
EMBL; AE000237; AAC74487.1; ALT_SEQ.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           D90778; BAA15009.1; ALT_SEO.
D90779; BAA1888.0.1; ALT_SEO.
D90779; BAA18881.1; ALT_SEO.
X62680; ... NOT_ANNOTATED_CDS.
                                                                                                                                                                                                                                             MEDLINE=92190338; PubMed=1665988;
                                                                                                                                                                                              SEQUENCE OF 464-2003 FROM N.A.
                                                                                                                           corresponding to the 28.
DNA Res. 3:363-377(1996)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          489
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          vdbA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Ecogene, EG11307, ydb.
Hypothetical protein,
CONFLICT 489 48
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             EMBL;
EMBL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            EMBL;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
           g
```

```
1076 DOTGVININVGTGQAFYNDGTGTIVNYGTICTFGVCQSGNEYNNTDDFTSLIYTGGDTIT 1135
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1136 RSGETVTLNKSAAVTDK-----LAGNVVNSGTLSGDQITVSSGLLE---NTSGGIIN-- 1184
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              953 THAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQIT 1012
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            185 -----NLVKLDKGAVIKNAGVM----TNN---VDVSGGILNNAGEM-----TAQIT 1223
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1013 IKKGIDGEDSSSDATSN---ANLTIKTKELKLTEDLSISG--FNK------AEIT-- 1056
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1224 MNAGADSSLVNNTGTINKIVQNAGVFNNSGSVTGRMMSAGGVFNNQTDGAIMRGAALTGT 1283
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1057 --AKDGRDLTIGNSNDGNSGAEAK---TVTFNNVKDSKISADGHNVTLNS----- 1101
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1102 KVKTSSSNG-----GRESNSDNDTGLTITAK---------NVEVNKDIT 1136
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1344 NISNSSHNGAVNMMGGNGRFINDGTIDVSAKSLVVSANNAGDQNAFFWNQDNGVINFDHD 1403
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1137 SLKTVNITASEKVTTTAG-STINATNGKASITTKTGDI--SGTIS-------GNT 1181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1404 SASAVKVTHSNFIAQNDGIMNISGTGAVAMEGDKNAQLVNNGTINLGTAGTTDTGMIGMQ 1463
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1182 VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIG-----GTI------SGNTV 1223
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1464 LDANATADAVIENNGTINIFANDSFAFSVLGTVGHVVNNGTVVIADGVTGSGLIKQGDSI 1523
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1224 NVTANAGDLTVGNGAEINATEGAATLTATGNTLTT-----EAGSSITSTKGQVDLLAQNG 1278
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   961 AENOGKITLDSMWVDANDTTAM-RDIASNSAIDFGTGVGVGTDSYSGAGKNAT----AIN 1015
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 831 ILGGNVT-----EGGQNSSSSI--TGNITIEK------AANVTL-----EANNAPN 868
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   898 KG--NLTISESATFKGKTRDTLNITGNFTNNGTA----EINITQGVVKLGNVTNDGDLNIT 952
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          869 QQ----NIR-----DRVIKLGSLLVNG------SLSLTGENADI 897
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            848 AF--VTGENTTGINSGT----ISLLONGKDPAPSPIVLLATNGGSATNAGTITGKVTEQ 900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        901 HSVFNKYSTGTSNSFIFNNDVSSITGLVAQSNSTIINTDSGIIDLYGRGSVGMLAIADST 960
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        772 ISNGANFTLNS-HVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNIS 830
                                                                                                                                                                                                                                                                                                                                                                                                                                         662 HW------CARGETTQYRSSAGV 699
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 700 NFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFLANI--TATGGGSVFFDIYAN 757
556 GAHGVENIGDNG--TVNNKGDIVVSDTGSIGVLINGE-----GATVSNTGDVNVSNEAT 607
                                                                                                                                                              558 --NITLDQGFLNIT-----GASVAFEGGNNKARDAA-NAKIVAQ------GT 595
                                                                                                                                                                                                            608 GESITINSGKVSLAGSMQVGDFSTGVDLNGNNNSVTLAAKDLKVVGQKATGINVSGDANT 667
                                                                                                                                                                                                                                                          668 VNITGNVLVDKDKTADNAAEYFFDPSVGINVYGSDNNVTLDGKLTVVSDSEVTSRQSNLF 727
                                                                                                                                                                                                                                                                                                                                                   633 ...----SGTINISGNITI------NQTTRKNTSYWQTS-----HDS 661
                                                                                                                                                                                                                                                                                                                                                                                              728 DGSAEKTSGLVVIGDGNTVNMNGGLELIGEKNALADGSQVTSLRTGYSYTSVIVVSGESS 787
                                                                     511 SI----NIGSNSHLILHSKG-----QRGG-GVQIDGDITSKGGNLTIYSGGWVDVHK--- 557
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         _
_
...
_
_
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       QC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               οχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Вþ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               В
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         QΫ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                а
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                qq
                                                                                                                         q
                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                               òγ
                                                                                                                                                                                                                                                                                                       Db
                                                                                                                                                                                                                                                                                                                                                        òχ
                                                                                                                                                                                                                                                                                                                                                                                                Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Пр
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ŏλ
                                                                                                                                                                      δŏ
```

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bioinformatics and the EMBL outstation the European Bioinformatics Institute. There are no restrictions on its muse by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial entities requires a license agreement (See http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch).
1524 NVEGMNGN--NGNSSEVHYGDYTLPDVPKPNTVSVTSGSDEAGGSMNNLNGYVVGTNVNG 1581
                               SIAGSINAANVILN-----TTGTLTT-----VAGS---DIKATSGTLVINAKDAK 1320
                                                    1321 LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITG---DLNTVNGLNIISKDGRNTVRLR 1377
                                                                                                               1378 GKEIEVKYIOPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVN 1437
                                                                                                                                                                                     1695 SALKQVS----GSQATTVFREARVLSNRFSMLADAAPKVGNGLAFNVVAKGDPRAELGNN 1750
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Anderson B.E., McDonald G.A., Jones D.C., Regnery R.L.;

"A protective protein antigen of Rickettsia rickettsii has tandemly repeated, near-identical sequences.";

Infect. Immun. 58:2760-2769(1990).

-!- FUNCTION: ELICITS PROTECTIVE IMMUNITY.

-!- SUBCELLULAR LOCATION: CELL WALL. THIS BACTERIUM IS COVERED BY A SLAYER WITH HEARGONAL SYMMETRY.
                                                                                                                                                                                                                                                                                                                                                                       01-APR-1990 (Rel. 14, Last sequence update)
16-OCT-2001 (Rel. 40, Last annotation update)
Outer membrane protein A precursor (190 kDa antigen) (Cell surface
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       POTENTIAL.

OUTER MEMBRANE PROTEIN A.

13 X APPROXIMATE TANDEM REPEATS.

A (TYPE I).

C (TYPE II).

C (TYPE II).

F (TYPE II).

G (TYPE II).

G (TYPE II).

I (TYPE I).

G (TYPE II).

G (TYPE II).

G (TYPE II).

H (TYPE I).

I (TYPE I).

I (TYPE I).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   -!- PTM: GLYCOSYLATED (PROBABLE).
-!- SIMILARITY: BELONGS TO THE RICKETTSIAE OMPA/OMPB FAMILY.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Bacteria; Proteobacteria; alpha subdivision; Rickettsiales;
Rickettsiaceae; Rickettsieae; Rickettsia.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Pfam; PF02708; rOmpA_rOmpB; l.
Antigen; Repeat; Signal; Cell wall; S-layer; Glycoprotein.
                                                                                                                                                                                                                  1438 TQNEFTT-----RPSSQVIISEGKACFSSGNGARVCTNVADDG 1475
                                                                                                                                                                                                                                           PRT; 2249 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PIR; A41477; A41477.
InterPro; IPR003858; rOmpA_rOmpB.
Pfam; PF02708; rOmpA_rOmpB; 1.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            MEDLINE=90354033; PubMed=2117568;
                                                                                                                                                                                                                                                                                                                                                        01-APR-1990 (Rel. 14, Created)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          EMBL; M31227; AAA26380.1; -.
                                                                                                                                                                                                                                                                                                                                                                                                      Outer membrane protein A pantigen) (rompA) (romp A).
                                                                                                                                                                                                                                                                                                                                 STANDARD;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       2249
1180
                                                                                                                                                                                                                                                                                                                                                                                                                                                    Rickettsia rickettsii
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 NCBI_TaxID=783;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      212
287
359
431
506
578
653
                                                                                                                                                                                                                                                                                                                              OMPA_RICRI
P15921;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     SIGNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       DOMAIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   REPEAT
REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                REPEAT
REPEAT
                                                                                                                                                                                                                                                                                                               OMPA_RICRI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  REPEAT
                                                                                                                                                                                                                                                                                               RESULT 3
                                                                                                                                                                                                                                                                                                                            g
                                                                                           ò
                                                                                                                        a
                                                                                                                                                                                   Dp
                                                                                                                                                       ò
                                                                                                                                                                                                                    δ
```

```
68;
                                                                                                                                                                                                      119 NNNSAVFNRVTSNQISQLKGILDSNGQVFLINPNG-----ITIGKDAIINTNGFTAST 171
                                                                                                                                                                                                                                                                                                                  172 LDISNENIKARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSI 231
                                                                                                                                                                                                                                                                                                                                                                      232 SLLAGQKITISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSV 291
                                                                                                                                                                                                                                                                                                                                                                                                                                                  292 SKDKSGNIVLSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGET 351
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      181 OSAAPSKITLA---GNIDGGGIITVKTDAAINGTIGNTNALATVNVGA-----GTA 228
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   229 TLGGAVIKATTTKLTNAASVLTLTNANAVLTGAIDNTTGGDNVGVLNLNGALSQVTGDIG 288
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      565
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                959 QRSIIGGDIINKKGSL----NIIDSNNDAEIQIGGNISQKECNLTISSDKINITKQITI 1013
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               352 YLGG-----DERGEGKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNIN 404
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            405 AQGSGDIAKTGGFVETSGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFP 464
                                                                                                                                                                 Conservative 197; Mismatches 593; Indels 388; Gaps
                                                                                                                                                                                                                                    391 DNASAVTFT-----NPVVVTGAIDNTGNANNGIVTFTGNSTV-TGDIGNTNALATVNVGA 444
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    672 TGANFTFIKYISSNSKGLTTQYRSSAGVNFNG---VNGNMSFNLKEGAKVNFKLKPNENM 728
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        566 LNITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKG-LNIISS 624
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               445 GTATLGGAVIKATTTKLTNAASVLTLTNANAVLTG-----AIDNTTGGDNVGVLNLNGA 498
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   729 NTSKPLPIRFLANI----TATGGGSVFFDIYANHSGRGAELKMSEIN-ISNGANFTLNS 782
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           580 NTNS-----LATISVGAGTATLGGAVIKATTTKLTNAASVLTLTNANAVLTGA---IDN 630
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    783 HVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG-- 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 631 TTGGDN------VGVLNLNGALSQVTGDI-----GNTNSLATISVGAGTATLGGAV 675
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  -QNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKG 899
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         676 IKATITKIINAVSAVKFIN-------PVVVIGAIDSTG-NAN-NG 711
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   900 NLTISESATFKGKTRDTLNITGNFTN-NGTAEINITQGVVKLGNVTNDGDLNITTHAKRN 958
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             135 TLNAGKSLTLNGNNAVAANHGFDAPADNYTGLGNIALGGAN----AALI-----I
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    289 NINSLATISVGAGTATLG-----GAVIKATTTKLTDAASAVKFTNPVVVTGAIDN---
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          465 TGTGEASDPKKNSELKTTLTNTTISNYLKNA---WTMNITASRKLTVN-----SSINIG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         516 SNSHLILHSKGQRGGGVQIDGDITSKG-----GNLTIYSGGWVDVHKNITLDQGF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     625 VNNLTHNLSGTINIS------GNITINQTTRKNTSYWQTSHDSHWNVSALN--LE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           499 LSQVTGNIGNTNSLATISVGAGTATLGGAVIKATTTKLT-----DAASAVKFTNPVVV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            552 TGA----IDNTGNANNGIVT-----FTGNSTVTGDIG-----
950 1021 K (TYPE II).
1022 1093 L (TYPE II).
104 1165 M (TYPE II).
1166 1180 TYPE I (INCOMPLETE).
2249 AA: 224333 MW; A9D6646C089DF087 CRC64;
                                                                                                                                                Pred. No. 1.1e-13;
                                                                                                                             6.9%; Score 511; DB 1;
                                                                                                                                              Best Local Similarity 22.18;
Matches 335; Conservative 19
                                          REPEAT
REPEAT
SEQUENCE
                                                                                                                             Query Match
    REPEAT
REPEAT
      SETT
                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
```

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bloinformatics and the EMBL outstation the Buropean Biolinformatics Institution. There are no restrictions on its use by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1433 TITV-----INTQN-EFTTRPSSQVI-------ISEGKACFS 1460
                                                                                                                                                                                                                                                                                                                                                 1090 VTGNVGNTNALATVNVGAGLLQVQGGVVKANTINLTDNASAVTFTNPVVVTGAIDNTGNA 1149
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1378 ----GKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNN 1432
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1207 PLDGGGGKHIPY-YFKGAIANGNNAI--LNVNTKLLTASHLTIGTVAEINIGA-----GN 1257
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1258 LFTIDASVGDVTILNAQNINFRARDSVLVLSNLTGVGVNNILLAADLVAPGADEGTVVFN 1317
                                                                                                                                                                                                                                                                                                                     1224 NVTANAGDLTVGNGA----EINATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGS 1279
                                                                                                                                                                                                                                                                                                                                                                                                       1280 IAGSINAAN--VTLNTTGTLTTVAGSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNA 1337
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1338 SGSGSVTAATSSSVNITGDLNTVNGL--------NIISKDGRNTVRLR- 1377
                                                                               ----SKVKTSSSNGGRE 1113
                                                                                                                                                                                                                                        1165 SITTKTGDISGTIS-GNTVSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTV 1223
                                                                                                                                                                                                                                                                                  977 --TTKLTDAASAVKFTNPVVVTGAIDNTGNANNGIVTFTGNSTV---TGNVGNTNALATV 1031
1014 KKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDG-- 1071
                                                                                                                                                          1114 SNSDNDTG-----LTITAKNVEVNKDI---TSLKTVNITASEKVTTTAGSTINATNGKA 1164
                                                                                                                     863 NLNGALSQVTGDIGNTNSLATISVGAGTATLGGAVIKATTTKLTNAASVLTLTNANAVLT 922
                                                                                                                                                                                                  923 GAIDNTTGGDNVGVLNLNGALSQVTGDIGNTNSLATISVGAG--TATLGGAVIKAT---- 976
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             01-NOV-1995 (Rel. 32, Created)
01-NOV-1995 (Rel. 32, Last sequence update)
16-OCT-2001 (Rel. 40, Last annotation update)
Heme/hemopexin-binding protein precursor (Heme:hemopexin utilization
                                       810 SVG-----AGTATLGGAVIKATTTKLTNAASVLTLTNANAVLTGAVDNTTGGDNVGVL 862
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Proteobacteria; gamma subdivision; Pasteurellaceae;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         "The 100 kDa haem: haemopexin-binding protein of Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       STRAIN-THI N182;
MEDLINE-9511556; PubMed-7815944;
MEDLINE-9511556; PubMed-7815944;
MEDLINE-9511556; PubMed-7815944;
Mueller-Eberhard U., Hansen E.J.;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  BINDS HEME/HEMOPEXIN COMPLEXES.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       917 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 influenzae: structure and localization.";
Mol. Microbiol. 13:863-873(1994).
                                                                                    1072 ---NSGAEAKTVTFNNVKD-SKISADGHNVTLN----
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           -!- SUBCELLULAR LOCATION: Secreted.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          STANDARD;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1461 SG-NGARVCTNVA 1472
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1318 GGVNGLNVGSNVA 1330
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Haemophilus influenzae
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         SECUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 NCBI_TaxID=727;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      FUNCTION:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Haemophilus.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          HAEIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Óλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                               οp
                                                                                                                                                                                                                                                                                                                                                                                                            οy
                                                                                                                         g
                                                                                                                                                                    ŏ
                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                              ò
```

```
52;
entities requires a license agreement (see http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      515 GSNSHLILHSKGQRGGGVQID-GDITSKGGNLTIYS-GGWVDVHKNITLDQGFLNITAAS 572
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               522 AGGFEKVNLDKIVATGQTNFXIDGGVSRNNSRY--------EYGV----- 558
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    682 ISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFLAN 741
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   293 KDKSGNIVLSAKEGEAEI-----GGVISAQNQQAKGGKLMITGDKVTLKT----GAV 340
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        243 -- KAGEITLSAK-GRKEALDSLVMNNGVLEATKVSNRNGKVVLSADNVQLNNESNIKGEI 299
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       400 DGNINAQGSGDIAKTGGFVETSGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGI 459
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            339 NGNFGRENSG-----THYNEERKTL-NTEV 362
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               460 NDEFPTGTG-EASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTVNSSINI---- 514
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       422 GTDSLLKLTNQGH----INIDHADINSKGRLFVVTSLQNDVDFKSNITITDSKINLGNGA 477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   573 VAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLNIISSVNNLTHNL 632
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     478 MGLGRSVNEDDYATRWK-----RAEKSQRKKFNVDMRNV----VFNQVDEVI--L 521
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          633 SG---TINISGNITINQT----TRKNTSYWQTSHDSHWNVSALNLETGANFTFIKY 681
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    341 IDLSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKGS-TINVSGKEKGGFAIVWGDIALI 399
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  300 VNF----GTEVTSNEDKK-----LKITSKTGSKVTSPKINFKGKSVN-----I 338
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      176 NENIKARNFTFEQTKDKAL---AEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSIS 232
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              233 LLAGQKITISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVS 292
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   201 -TINGKVYLSSGYNFTFTLS---DSGISVALEDNTVRG------IVQNEGSI----- 242
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              118 ENNNSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDIS-- 175
                                                                                                                                                                                                                                                                                                                                                                                                                             Query Match
6.9%; Score 509; DB 1; Length 917;
Best Local Similarity 24.4%; Pred. No. 4.4e-14;
Matches 254; Conservative 167; Mismatches 372; Indels 248; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         62 IPQSVL-ASGLQGMD-VVHGTATMQ--VDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQ 117
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         26 LPQQGLPQQGLPQGEDKVVVGQATFDKTIADKMTINQTSDKVQINWHSFDIGQNKEVEFKQ 85
                                                                                                                                                                                                                                                                                                                                        2 X 6 AA APPROXIMATE TANDEM REPEATS.
                                                                                               BY SIMILARITY.
HEME/HEMOPEXIN-BINDING PROTEIN
3 X 5 AA TANDEM REPEATS.
                                                                                                                                                                                                       6 AA APPROXIMATE REPEATS
                                                                                                                                                                                                                                                                                                                                                                                          100148 MW; 7FF39BBBC046539D CRC64;
                                                            EMBL; U08349; AAA74139.1; -.
                                                                                Fransport; Signal; Repeat.
                                                                                                                                                                                                                                                                                                                                                                                 165 1
917 AA;
                                                                                                                                                                                                                                                                                                                                                                                                     SEQUENCE
                                                                                                                                      DOMAIN
                                                                                                                                                                                                                                                                                                                                              DOMAIN
                                                                                                                                                                                             REPEAT
                                                                                                                                                                                                                DOMAIN
                                                                                                                                                                                                                                                                         REPEAT
                                                                                                                                                                                                                                                                                                                                                                REPEAT
                                                                                                                                                          REPEAT
                                                                                                                                                                           REPEAT
                                                                                                                                                                                                                                                                                                           REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 QY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 П
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Ω
```

:: ---:

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bioinformatics and the EMBL outstation the European Bioinformatics Institute. There are no restrictions on its use by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial entities requires a license agreement (See http://www.isb-sib.ch/announce/or send an email to license@lsb-sib.ch).
                                                                                                                                                                                                                                                                                             951 ITTHAKRNQRSIIGGDI-INKKGSLNITDSNNDAELQIGGNISQKEGNLTISSDKINITK 1009
-----LDLDYRTQLS------ELEQGRR-RWRYRDLDLDMNKAYLYR---- 594
                                                       742 ITATGGSVFFDIYA-NHSGR----GAELKM--SEINISNGANFTLNSHVRGDDAFKINK 794
                                                                                               795 DLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGG---NVTLGGQNSSSSITGNI 851
                                                                                                                               642 DITFDKDNSQDTLAQTNRLGMNGKV-SMINS--HIKIVGDEKEGISPTGTYATMFLIGEL 698
                                                                                                                                                                   -----SLLVNGSLSLT 891
                                                                                                                                                                                               699 IGEKSSIFVKSHQGYTFKTDGDTKIAGKN--SKEDLKITAINTGGRAAEEVLINGALGSA 756
                                                                                                                                                                                                                              892 GENADIKG-NLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLN 950
                                                                                                                                                                                                                                                                                                                  01-NOV-1995 (Rel. 32, Created)
01-NOV-1995 (Rel. 32, Last sequence update)
16-OCT-2001 (Rel. 40, Last annotation update)
Heme/hemopexin-binding protein precursor (Heme:hemopexin utilization
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Cope L.D., Yogev R., Mueller-Eberhard U., Hansen E.J.;
"A gene cluster involved in the utilization of both free heme and
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Bacteria; Proteobacteria; gamma subdivision; Pasteurellaceae;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Cope L.D., Thomas S.E., Latimer J.L., Slaughter C.A., Waller-Bberhard U., Hansen E.J.; The 100 Mba haem-haemopexin-binding protein of Haemophilus influencaes structure and localization.";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    HEME/HEMOPEXIN-BINDING PROTEIN.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           heme hemopexin by Haemophilus influenzae type b.";
J. Bacteriol. 177:2644-2653(1995).
-!- FUNCTION: BINDS HEME/HEMOPEXIN COMPLEXES.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    928 AA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SEQUENCE FROM N.A., AND SEQUENCE OF 22-35
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  PRT;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            -1- SUBCELLULAR LOCATION: Secreted.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   STRAIN=DL42 / Serotype B;
MEDLINE=95115556; Pubmed=7815944;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             STRAIN=DL42 / Serotype B;
MEDLINE=95270579; PubMed=7751272;
                                                                                                                                                                                                                                                                                                                                                               1010 QITIKKGIDGEDSSSDATSNA 1030
                                                                                                                                                                                                                                                                                                                                                                                             873 LVS---SLDVEKLVSVAVCDA 890
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              EMBL; U08348; AAA74138.1; -.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               SEQUENCE OF 1-30 FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    STANDARD;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Fransport, Signal, Repeat.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Haemophilus influenzae.
                                                                                                                                                                 852 TIEKAA----
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Haemophilus.
NCBI_TaxID=727;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               HXA2_HAEIN
P45354;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 HXA2_HAEIN
 559
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SIGNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                               RESULT 5
                                 ò
                                                              g
                                                                                                 δ
                                                                                                                               g
                                                                                                                                                                δ
                                                                                                                                                                                             g
                                                                                                                                                                                                                                                            q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ŏ
                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                              ò
```

```
Gaps
                                                                                                                                                                                                                                                          77 VHGTATMQ---VDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENNNSAVFNRVTSNQIS 134
                                                                                                                                                                                                                                                                                                                  QLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDIS--NENIKARNFTFEQTKDK 192
                                                                                                                                                                                                                                                                                                                                   193 ALAEIVNHGLITVGKDGSVNLIGGKVKNEGVIS------VNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                152 ----QVLKEGLVL---KDGQV-VKEGQVINEGNITAQDEVVLNGDEVINKGNINVEKNSTIN 205
                                                                                                                                                                                                                                                                                                                                                                                                                                 241 ISDIINPTITYSIAAPENE-AVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNI 299
                                                                                                                                                                                                                                                                                                                                                                                                                                                             206 GKVYLSSGYNFTFTLPDSGISVALED-----NTVQGIVKNEGSI------KAGEI 249
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        300 VLSAKEGEAEI-----GGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYL 353
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  354 GGD--ERGEGKNGIQLAKKTSLEKGS-TINVSGKEKGGFAIVWGDIALIDGNINAQGSGD 410
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           305 GADVISNKELKDNIKIISKTGSKVTSPKINFTGKSVN------INGNFGREDS-- 351
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         411 IAKTGGFVETSGHDLFIKDNAIVDAKEWLLDF-DNVSINAEDPLFNNTGINDEFPTGTGE 469
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  470 ASDPKKNSELKTTLINTISNYLKNAWIMNITASRKLTVNSSINI----GSNSHLILHSK 525
                                                                                                                                                                                                                                                                            352 -----TTHYKDEFKKLNTEVN----IDVPDNENIRIAD-IEDNTGTG---TTGTGT 394
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     395 SS------FIQTGALSSELANNGKVNLKGN-NVNISGRIHIDSFRGSDSLLKLTNK 443
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        526 GQRGGGVQI-DGDITSKGGNLTIYS-GGWVDVHKNITLDQGFLNITAASVAFEGGNNKAR 583
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  444 GH----IDINNADIHSKGRLFFITSLQNEEDFKSNITITDSKINLGNGAMGL-GRSVDEK 498
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 DAANAKIVAQGTVTITGEGKDFRANNVSLN-----GTGKGLNIISSVNNLTHNLSGT 635
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   636 IN--ISGNITINQTTRKNTSYWQTSHDSHWNVSALN------LETGANFTFIKYI 682
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     550 INFYIDGGVSRN---GRKYEYGVLDLDKRTQLSELNQGRRRWGYYYDLELDMNRAYL--- 603
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                683 SSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFLANI 742
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         743 TATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTLNS---HVRGD----DAFKINKD 795
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    -------FDLFATKNTGRSTIKDTEINISN-SNINLKNGFVHLLAEKIKLDNSKI---D 653
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 LTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTL-GGQNSSSSITG---- 849
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      554 ITEDKDNSQDTLAQT-----NRLGMNGKVSMINSHIKIVGDEKEGISPTGTYATM 703
                                                                                                      250 TLSAKGRKQALDSLVMNNGVLEATKVSNKNGKVVLSADNVELNNESNI----KGEIVTF
                                                                                                                                                                                                                                       267;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               -----YR------Y
                                                                                                                                                                                                          DB 1; Length 928;
 6 X 6 AA APPROXIMATE REPEATS.
1-1.
1-2.
1-3.
1-4.
1-5.
                                                                                                                                                                                                                                      Indels
                                                                                                                                                             172 2-4.
101228 MW; 67D45466A4B92390 CRC64;
                                                                                                                                                                                                                       llarity 23.8%; Pred. No. 3.7e-13;
Conservative 166; Mismatches 363;
                                                                                                                                                                                                          Score 486.5;
                                                                                                                                                                                                      6.68;
                                                                                                                154
160
166
172
                                                                         640
679
172
                                                                                                                                                                         928 AA;
                                                                                                                                                                                                                  Similarity
                                                                                                                                155
161
167
                                                                                                                                                                                                                              Matches 249;
                                                                                                                                                                         SEQUENCE
                                                                                                                                                                                                   Query Match
                                                                                                                                                                                                                   Local
                                       REPEAT
REPEAT
                                                                    REPEAT
REPEAT
                                                                                                   DOMAIN
                            REPEAT
                                                                                                                REPEAT
                                                                                                                                REPEAT
                                                                                                                                            REPEAT
                                                                                                                                                           REPEAT
                                                                                                                                                                                                                                                                                                                  135
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      909
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   96/
FT
FT
FT
FT
FT
FT
FT
SO
                                                                                                                                                                                                                                                                                                                                            QΩ
                                                                                                                                                                                                                                                                                     pp
                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                         ŏ
                                                                                                                                                                                                                                                                                                                                                                                                    q
                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ð
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ô
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    염
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ă
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Q
```

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bioinformatics and the EMBL outstation the European Bloinformatics Institute. There are no restrictions on its use by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial entities requires a license agreement (See http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    -1- SUBCELLULAR LOCATION: CELL WALL. THIS BACTERIUM IS COVERED BY A S-LAYER WITH HEXAGONAL SYMMETRY.
-1- SIMILARITY: BELONGS TO THE RICKETTSIAE OMPA/OMPB FAMILY.
                                                                                                                                                                                                                                                                                  947 GDLNITTHAKRNQRSIIGGDI-INKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKI 1005
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Query Match

6.4%; Score 476.5; DB 1; Length 1656;
Best Local Similarity 21.8%; Pred. No. 1.9e-12;
Matches 346; Conservative 204; Mismatches 598; Indels 437; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                30-MAY-2000 (Rel. 39, Last sequence update)
16-OCT-2001 (Rel. 40, Last annotation update)
Outer membrane protein B precursor (168 Kba surface-layer protein)
(Surface protein antigen) (Cell surface antigen 5) (Sca5) (rompB)
(romp B) [Contains: 120 Kba surface-exposed protein (Surface protein antigen) (120 kba outer membrane protein ompB); 32 kba beta peptide].
850 ------NITIEKAANVTLEANNAP-----NQONIRDRVIKLG----SLLVNGS 887
                                                                  704 FLIGELIGEKSSIFVKSHOGYTFKTDGNTKIAGKYSKEDLKITAINTGGRAAEEVLINGA 763
                                                                                                                                         888 LSLTGENADIKG-NLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTND 946
                                                                                                                                                                                                       764 LGSADNDANIANMAFTIGDSANTK-TTIENADITALAPNGGTAYLSSKDVEIEVKPNSNF 822
                                                                                                                                                                                                                                                                                                                           THE 32 KDA BETA PEPTIDE MAY SERVE AS A MEMBRANE ANCHOR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Cohiyama T.: Sequencing of the gene encoding the protein rOmp B of Rickettsia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              120 KDA SURFACE-EXPOSED PROTEIN.
32 KDA BETA PEPTIDE.
POLY-GLY.
MW; 3132A69C9DD5999F CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Bacteria; Protecobacteria; alpha subdivision; Rickettsiales; Rickettsiaceae; Rickettsieae; Rickettsieae
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     PRT; 1656 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                   1006 NITKQITIKKGIDGEDSSSDATSNA 1030
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            EMBL; AB003681; BAA20138.1; -.
InterPro; IPR003858; rOmpA_rOmpB.
Pfam; PF02708; rOmpA_rOmpB; 1.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          880 INTKLVS---SLDVEKLVSVAVCDA 901
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    528 533 POI
1656 AA; 168097 MW;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               30-MAY-2000 (Rel. 39, Created)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Antigen; S-layer; Cell wall.
CHAIN 1 1338
CHAIN 1339 1656
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         STANDARD;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Rickettsia japonica.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           SIMILARITY)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      NCBI_TaxID=35790;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             OMPB_RICJA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         SEQUENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        DOMAIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SOT THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPER
                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                   οý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Dp
                                                                                                                                                 ò.
                                                                                                                                                                                                                    ga
                                                                                                                                                                                                                                                                                          δλ
```

```
:|| : | | : | | :|| 688 LAAGTNLGSAANPLAEINFGSKGARADTVLNVGEGVNL-----YATNITTIDANVGSF 740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  741 VF----NIVSGK------775
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   819 GPINVTLNKQAVP-----VNALKQITVSG------PGNVVVNEIGNAGNYHG 859
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     912 KTRDTL-----INITGN-----FTNNGTAE-----INITQG 936
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    860 AMIDIIAFENSSLGAVLFLPSGIPFNDAGNTIPLTIKSTVGNETAEGFSVPSVIVSGVDS 919
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         937 VVKLGNVTNDGDLNITTHAKRNQRSIIG------GDIINKK-----GSLNITDSNNDA 983
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           695 SSAGVNF-NGVNGNMSFNL-KEGAKVNFKLKPNENMNTSKPLPIRFLANITATGG--GSV 750
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            751 FFDIYANHSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQT 810
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                811 KDDFYDGYARNAINSTYNISILGGNVTLGGQNSSSSITGNITIEKAA------- 857
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            776 ------LGNATFN-----GNTTIAA-NSTLQISGNYTADFIASADGTGIVEFVNT 818
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    858 ---NVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGNLTISE---SATFKG 911
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              635 TTLNGGNVAINELVIGNNGSVQFAHNTYLITRTTNAAGQGKIIFNPVVNNNT-----T 687
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                358 -QSANANGOVNFRHIVDVGIDGTTAFKTAASIVAITQNSNFGT----TDFGNLAAQVTVP 412
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  453 LFNNTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTVNSSI 512
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              413 --DIMTLIGNF---TGDANNPGNTAGVITFAANGTLASASADA---NVAVTNNITAIEAS 464
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   513 NIG----SNSHLILHSKGQRGGGVQI-DGDITSKGGNLTIYSGGWVDVHKNITLDQGFLN 567
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     568 ITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNG------TGKGLN 620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    523 ITGD--IGNGGGGAALQSITLANDATKTLTLGG-----ANIISANGGTINFQANGGTIK 574
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      575 LTSTQNNIVVDCDLAIATDQTGVVDASSLTNAQTLTISGTIGIIGANNTTLGOFNIGSSK 634
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       639 ----SGNITINQTTRKNTSYWQTSHDSHWNVSALNLETGANFTFIKYISSNSKGLTTQYR 694
                                                                                                                                                                                                                                                                                                                                                        220 NEGVISVNGGSISLLAGQKITISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAAT 279
                                                                                                                                                                                                                                                                                                                                                                                                       223 -----KAINIGD--GQGFMFNTN-AT 249
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              250 NANALNLQAGGTTINFNGTDGTGRLVLLSKNGAATDFNVTGSLGGNLKG-----IIE 301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             335 LKTGAVI-DLSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVW 393
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               302 LNTVAINGQLIANAGPANAVIGTNNGAGR---AAGFVVSVDNGKAATIDGQVYAKDMVI- 357
                                                                                                 55 FDQTVALANVAVAPNAVITANANNGINLNTPAGSFNGLFLSNANNLAVTVSEDTTLGFIN 114
                                                                                                                                                   128 VTSNQISQLKGILDSNGQVFLINPNGIT------16KDAIINTN---- 165
                                                                                                                                                                                                        115 NAANNANRENLTLDA-GKTLTITGQGITNVQSAATHNAQNIVAKFNGGAAIANNDLSGLG 173
                                                                                                                                                                                                                                                          166 ----GFTASTL--DISNENIKARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVK 219
                                                                                                                                                                                                                                                                                                      174 TIDFGAAASTLVFDLAN-----PTTQKAPLILADNALIVNGANGTLNVTNGFIQ 222
                                                                                                                                                                                                                                                                                                                                                                                                                                                         280 IRNQGKLSADSVS----KDKSGNIVLSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVT 334
                                                  88 -NKTIIRNSV----DAIINWKQFN-IDQNEMV-----QFLQENNNSAV-----FNR 127
2 AQKPNFLK-----KLISAGLVTASTATIVASFAGSAMGAAIQQNRTTNGVAT-TVDGVG 54
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 394 GDIALIDGNINAQGSGDIAKTGGFV-ETSGHDLFIKDNAIVDAKEWLLDFDNVSINAEDP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     οχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             óλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Ωÿ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Ωp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Óλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          οy
                                                                                                            qq
                                                                                                                                                                                                              q
                                                                                                                                                                                                                                                                Óγ
                                                                                                                                                                                                                                                                                                            ΩD
                                                                                                                                                                                                                                                                                                                                                                 òy
                                                                                                                                                                                                                                                                                                                                                                                                                Д
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         òy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     d
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          οy
                                                          Óγ
                                                                                                                                                              δy
```

```
984 EIQIGGNISQKEGNL----TISSDKINITKQITIKKGID--GEDSSSDATSNANLTIKT 1036
                                                                                                                                         964 TVTLSGGVPNTPGTVYGLGTGIGASKF---KQVTFTTDYNNLGNIJATNTINDGVTVTT 1020
                                                                                                                                                                                                                                                         1037 KELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISADGHN 1096
                                                                                                                                                                                                                                                                                                                                                       1097 VTLNSKVKTSSSNGG------RESNSDNDTGLTITAKNVEVNKDITSLKTVNITASE 1147
                                                                                                                                                                                                                                                                                                                                                                                                                          1070 GTVTYLGNAFVGNIGDSDTPVASVRFTGSNNCAGL----KGNIYSQVIDFGTYNLGIVN 1124
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1148 KVTTTAGSTINATNGKASITTKTGDISGTIS--GNTVSVSATVDLTTKS-GSKIEAKSGE 1204
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1125 SNVILGGST-TAINGKIDLLTNTLTFAGGTSTWGNNTSIETTLTLANGNIGHIVIAEGAQ 1183
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1205 ANVISATGTIGGTISGNTVNVTANA-----GDLT---VGNGAEINATEGAATLTATGNTL 1256
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1257 TTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINA 1316
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1184 VNATT-TGT-----TTINVQDNANANFSGTQTYTLIQGGARFNGTLGGPNFTVT---- 1231
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1317 KDAKLNGD---ASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNT 1373
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1287 INTAAYNNLLLAKNSADSANFVGTIVTDTSAAITNAQLDVAKDIQAQLGNRLGALRYLGT 1346
920 VIADGQVIGD-----QNNIVGLGLGSDNGIIVNATTLYAGIGTIN----NNQG 963
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        MEDLINE-94171067; PubMed-8125327;
Crocquet-Valdes P.A., Weiss K., Walker D.H.;
"Sequence analysis of the 190-kDa antigen-encoding gene of Rickettsia
Conorii (Malish 7 strain).";
Gene 140:115-119(1994).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   STRAIN=Indian tick typhus, M1, Malish 7, and Moroccan;
MEDLINE=97015921; PubMed=8862558;
Roux V., Fournier P.E., Raoult D.;
"Differentiation of spotted fever group rickettsiae by sequencing and
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          16-OCT-2001 (Rel. 40, List sequence update)
15-JUN-2002 (Rel. 41, Last sequence update)
15-JUN-2002 (Rel. 41, Last annotation update)
autigen) (rOmpa) (rOmp A).
OMPA OR RC1273.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Ogata H., Audic S., Renesto-Audiffren P., Fournier P.-E., Barbe V.,
Samson D., Roux V., Cossart P., Weissenbach J., Claverie J.-M.,
Raoult D.,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 evolution in Rickettsia conorii and R. prowazekii.";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       OMPA_RICCN STANDARD; PRT; 2021 AA.
Q52657; P95591; P95592; P95593; P95594; Q52667; Q52668; Q52669;
Q52670; Q52674;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Bacteria; Proteobacteria; alpha subdivision; Rickettsiales;
Rickettsiaceae; Rickettsieae; Rickettsia.
NCBI_TaxID=781;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1374 VRLRGKEIEVKYIQPGVASVEEVIE 1398
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   MEDLINE=21442074; PubMed=11557893;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   16-OCT-2001 (Rel. 40, Created)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             "Mechanisms of evolution in I
Science 293:2093-2098(2001).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      SEQUENCE OF 8-204 FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Rickettsia conorii.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     STRAIN-Malish 7;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          STRAIN-Malish 7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      OMPA_RICCN
                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                      Db
                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           A A C A A C A A C A A C A A C A A C A A C A A C A A C A A C A A C A A C A A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C A C
```

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bioinformatics and the EMBL outstation - the Buropaen Bioinformatics Institute. There are no restrictions on its use by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial entities requires a license agreement (See http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch).
analysis of restriction fragment length polymorphism of PCR-amplified DNA of the gene encoding the protein rOmpA.", J. Clin. Microbiol. 34:2058-2065(1996).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 N -> NN (IN STRAIN INDIAN TICK TYPHUS).

MISSING (IN STRAIN MI).

MISSING (IN STRAIN MORCCCAN).

MISSING (IN STRAIN MORCCCAN).

T -> II (IN STRAIN INDIAN TICK TYPHUS).

D -> A (IN STRAINS INDIAN TICK TYPHUS).

AND MORCCCAN).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      N -> + | (IN STRAIN MOROCCAN),
N -> | (IN STRAIN INDIAN TICK TYPHUS).
| 0 -> K (IN REF. 1),
| 1 -> V (IN REF. 1),
| 0 -> | (IN REF. 1),
| 0 -> | (IN REF. 1),
| 0 -> | (IN REF. 1),
| 1 -> V (IN REF. 1),
| 2 -> V (IN REF. 1),
| 3 -> V (IN REF. 1),
| 1 -> V (IN REF. 1),
| 1 -> V (IN REF. 1),
| 2 -> V (IN REF. 1),
| 3 -> V (IN REF. 1),
| 4 -> V (IN REF. 1),
| 5 -> V (IN REF. 1),
| 5 -> V (IN REF. 1),
| 6 -> V (IN REF. 1),
| 7 -> V (IN REF. 1),
| 7 -> V (IN REF. 1),
| 8 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 1),
| 9 -> V (IN REF. 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            REF. 1).

N -> D (IN REF. 1).

V -> I (IN REF. 1).

N -> D (IN REF. 1).

VN -> IS (IN REF. 1).

LLRVQGGVVKSNTIN -> KATLGGALIKATTTK (IN REF. 1).

D -> Y (IN REF. 1).
                                                                                                STRAIN=Indian tick typhus, M1, Malish 7, and Moroccan;
Raoult D., Fournier P.E., Roux V.;
"Phylogenetic analysis of spotted fever group rickettsiae by study
                                                                                                                                                            Antigen; Repeat; Signal; Cell wall; S-layer; Glycoprotein;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            OUTER MEMBRANE PROTEIN A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               REF.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                REF.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    POTENTIAL.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               THR-RICH.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  THR-RICH.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 InterPro; IPR003858; rOmpA_rOmpB.
Pfam; PF02708; rOmpA_rOmpB; 1.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     \ \ \ \ \
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       EMEL: AE008674; ARA13811.1; EMEL: AE008674; AAR49549.11; EMEL: U43798; AAR49551.1; EMEL: U43806; AAR49551.1; EMEL: U46918; AAR49551.1; EMEL: U46918; AAR8656.1; EMEL: U83440; AAR35176.1; EMEL: U83443; AAR35179.1; EMEL: U83453; AAR35189.1;
                                                                               SEQUENCE OF 953-2012 FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      EMBL; U01028; AAA17405.1; -.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2021
946
1528
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 60
76
137
133
954
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1308
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   10
92
126
137
157
388
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 640
669
793
804
823
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Complete proteome.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1308
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      CONFLICT
CONFLICT
CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      DOMAIN
DOMAIN
VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  VARIANT
VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            VARIANT
VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    SIGNAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     CHAIN
```

و در		
CONFLICT 1451 1451 H -> N (IN REF. 1).  CONFLICT 1624 1624 G -> D (IN REF. 1).  CONFLICT 1624 1624 G -> D (IN REF. 1).  CONFLICT 1872 1872	III	89 - KINGGIVITIGEGENERANUYSLNITGEGENITESSVINLITRIESSTITES 1   1   1   1   1   1   1   1   1   1
EFFFFFFFFF SO VO W M M M M M M M M M M M M M M M M M M		67 CO CO CO CO CO CO CO CO CO CO CO CO CO

```
1304 FNAKNGTVTL------NNNVNVAGTVKNTGGTNNGTLIVLGASNLNRVNGIAM 1350
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1351 LKVGAGNVTIAKGGNVKIGE----IQGTGTNTLTLPAHFKLTGSINKTGGQALKLNFMNG 1406
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1304 -----DIKATS---GTLVIN-AKDAKLNGDASGDSTEV----NAVNASGSGSVTAATSSS 1350
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1351 VNITGDLNTVNGLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLS 1410
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1525 LNTTFDGAAKSGGNILIKSG-STLDL-----SGVSNLALVVTATNF--DMNNIS 1570
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1411 DEERETLAKLGVSAVRFVEP----NNTITVNTQN---EFTTRPSSQVIISEGKAC---- 1458
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1225 VTANAGDLTVGNGAEINATEGAATLTATG-NTLTTEA----GSSITSTKGQ-VDLLAQNG 1278
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1279 ----TLNTTGTLTTVAGS- 1303
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1407 GSVSGVVGTAANSVGDITTAGATSFASSVNAKGTATLGGTTSFAHTFTNTGAVTLAKGSI 1466
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1152 -----TAGSTINATNGKASIT-----TKTGDISGTIS 1178
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1467 TSFAKNVTÄTSFVANSATINFGNSLAFNSNITGSGTTLTLGANQVTYTGTGSFT--DTLT 1524
                                                                                                                                                                                                                                                                                                983 AEIQIG-GN---ISQKEGNLTISSDKINITKQITIKKGIDGEDSSSDATSNA----NLT- 1033
                                                                                                                                                                                                                                                                                                                                   1021 AEINIGAGNLFAIDASAGDVTI------LINAODIHFRALDSALVLSNLTG 1064
                                                                                                                                                                                                                                                                                                                                                                                                                1078 KTVT-----FINNVKD--SKISADGHNVTLNSKVKTSSSNGGR------ 1112
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1113 -----ESNSDNDTGLTITAKNVEVNKDITSLKTVN-ITASEKVTT------ 1151
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1179 GNTVSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISG-----NTVN---- 1224
                                                                                                                                                                                                                                                        967 DFGA----RSTLEFNGPLDGGGNAIPYYFKGA--IANGNNAILNVNTKLLTAYHLTIGTV 1020
                                                                                                                                                                                                                                                                                                                                                                                  1034 IKTKELKLTEDLSISGFNKAEITAKDG-RDLTIGNS-----NDGNSGA------EA 1077
                                                                                  864 GNIGNTNALATISVGAGKA-----TLGGAIIKATTTKLTDNASAVTFTNPVVVT 912
                                                                                                                                                       952 TTHAKRNQRSII------GGDIINK--KGSLNITDSNND------- 982
813 QGGVVKSNTINLTDNASAVTFTNPVVVTG----AIDNTGNAN--NGIVTFTG---DSTVT 863
                                          849 GNITIEKA-ANVTLEANNAPNQONIRDRVIKLGSLLVNGSLSLTGENA----- 895
                                                                                                                              896 ---DIKGNLTISESATFKGKTRDTLNITGNFTN-NGTAEINITQGVVKLGNVTNDGDLNI 951
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   FHAB_BORPE STANDARD; PRT; 3591 AA. p12255.
01-CGT-1989 (Rel. 12, Created)
01-FEB-1996 (Rel. 33, Last sequence update)
01-FEB-1996 (Rel. 33, Last annotation update)
Filamencous hemagglutinin.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1459 -FSSGNGARVCTNVAD 1473
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1629 DFAPGGPLANIPNAAN 1644
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Bordetella pertussis.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    FHAB_BORPE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ID
DT
DT
DE
OS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Dβ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  рp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 οy
                                                                                                                              Qy
                                                                                                                                                                      Ωp
                                                                                                                                                                                                                òγ
                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                  δy
                                                                                                                                                                                                                                                                                                                                          pp
                                                                                                                                                                                                                                                                                                                                                                                    óλ
                                                                                                                                                                                                                                                                                                                                                                                                                            QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
```

```
925
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  933
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1037
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1124
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   831
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1139
                                                        ò
                                                                                         qq
                                                                                                                                                     q
                                                                                                                                                                                                                       g
                                                                                                                         ò
                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                   QQ
                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ŏλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         a
                                                                                                                                                                                                                                                                                                                                                      This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bioinformatics and the EMBL outstation the European Bioinformatics Institute. There are no restrictions on its use by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial entities requires a license agreement (see http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                88;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 54 LAWALMLACTGLPLVTHAQGL----VPQGQTQVLQGGNKVPVVNIADPNSGGVSHNKFQQ 109
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       146 ---VFLINPNGITIGKDAIINTNGFTAST------LDISNENIKARNFTFEQT-- 189
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                229 GYFDVVARLVKLQGAVSSKQGKPLADIAVVAGANRYDHATRRATPIAAGARGAA----- 282
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 218 VKNEGVISVNGGSISLLAGQKIT-----ISDIINPTITYSIAAPENEAVNLGD 265
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     -AMLLSLGVTSIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVD-----AIINWKQ 104
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 283 ---AGAYAIDGTAAGAMYGKHITLVSSDSGLGVRQLGSLSSPS---AITVSSQGEIALGD 336
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 337 ATVORGPLSLKGAGVVSAGKLAS-----GGGAVNVAGGGAVKIASASSVGNLAVQGGG 389
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        324
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                325 KLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKGSTINVSGK 384
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               385 E-------KGGFALVWGDIALIDGNINAQGS-----GDIAKTGGFVETSGHDL 425
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              611; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1 MN-KIYRLKFSKRLNALVAVSELARGCDHST-----EKGSEKPARMKVRHLALKPLS 51
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1 MNINLYRLVFSHVRGMLVPVSE-----HCTVGNTFCGRTRGQAR-SGARATSLSVAPNA 53
                                                                                                        .;
.;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               169 GADLIIANPNGISVNGLSTLNASNLTLTTGRPSVNGGRIGLDVQQGTVTIERGGVNATGL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     FNIDQNEMVQF-----LQENNN----SAVFNRVTSNQISQLKGILDSNGQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   -----ITVGKDGSVNLIGGK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                266 IFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIVLSAKEGEAEIGGVISAQNQQAK-GG
                                                                                                                                                                                                                           Relman D.A., Domenighini M., Tuomanen E., Rappuoli R., Falkow (
"Filamentous hemagglutinin of Bordetella pertussis: nucleotide somments and crucial role in adherence "
                                                                                               Relman D.A., Domenighini M., Tuomanen E., Rappuoli R., Falkow "Genetic characterization of Bordetella pertussis filamentous haemagglutinin: a protein processed from an unusually large
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Length 3591;
 Bacteria; Proteobacteria; beta subdivision; Alcaligenaceae;
                                                                                                                                                                                                                                                           sequence and cruciál role in adherence.";
Proc. Natl. Acad. Sci. U.S.A. 86:2637-2641(1989).
-!- FUNCTION: EVIDENCE FOR A ROLE IN HOST-CELL BINDING AND
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Indels
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Antigen; Hemagglutinin.
SEQUENCE 3591 AA; 367420 MW; EF7418B30D6E5138 CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            DB 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Best Local Similarity 19.7%; Pred. No. 9.5e-12; Matches 381; Conservative 286; Mismatches 653;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          6.3%; Score 469.5; 19.7%; Pred. No. 9.5
                                                                 SEQUENCE FROM N.A., AND PARTIAL SEQUENCE.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       EMBL; M60351; AAA22974.1; --
EMBL; M60351; AAA22975.1; ALT_INIT.
EMBL; M60351; AAA22976.1; ALT_INIT.
                                                                                                                                                                                                                                                                                                                            SUBCELLULAR LOCATION: SURFACE.
                                                                                MEDLINE-90355839; PubMed-2388559;
                                                                                                                                                                                                               MEDLINE=89202384; PubMed=2539596;
                                                                                                                                                                Mol. Microbiol. 4:787-800(1990).
                                                                                                                                                                                              SEQUENCE OF 1-3261 FROM N.A
                                NCBI_TaxID=520;
                                                                                                                                                                                                                                                                                                               INFECTION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       52
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     105
g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 엄
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
```

```
993 RAOOKLELGSVKSDGGLQAAAGGALSLAAAEVAGALELSG----QGVTVDRASASRARID 1048
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1049 STGSVGI----GALKAGAVE-----AASPRRARRALRODFFTPGSVVVRAQGNVTVGR 1097
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        979 SNNDAEIQIGGNI--SQKEGNLTISSDKINITKQITIKKGIDGEDSSSDATSNANLTKT 1036
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1098 GDPHQGVLAQGDIIMDAKGGTLLLRNDALTENGTVTI-----SADSAVLEHSTIES 1148
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | :| :| :| ; | | | | 1108 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1199 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 1119 | 119 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 1199 | 119
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1065 IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNG-GRESNSDNDTGLT 1123
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1209 TGEARKDES------VVSDAALVADGGPIVVEAGELVSHAGGIGNGRNKENGASVT 1258
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1259 VRTTGNLVNKGYISAGKQGVLEVGGALTNEFLVGSDGTQRIEAQRIENRGTFQSQAPAGT 1318
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1319 AGALVVKAAEAIVHDGVMATKGEMQIAGKGGGSPTVTAGAKATTSANKLSVDVASWDNAG 1378
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1165 SITTKTGDISCTISGNTV---SVSATVDLTTKS-----GSKIEAKSGEANVTSATGT--- 1213
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1379 SLDIKKGGAQVTVAGRRYAEHGEVSIQGDYTVSADAIALAAQVTQRGGAANLTSRHDTRFS 1438
                                                                                                                                                                                                   426 FIKDNAIVDA------KEWLLD----FDNVSINAEDPL-FNNTGINDEFPTGTGEA-- 470
                                                                                                                                                                                                                                                                                                                                           --RANELVSSAQLEVRGOREVALDDASSARGMTVVAAGALAARNLQSKGAIGVQGGEAVS 562
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              K-----EITAKDGR----DLT 1064
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1214 ----IGGTISGNTVNVTANAGDLTVGNGAEINA----TEGAATLTATGNTLTTEAGSSIT 1265
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    525 KGQRGG-GVQIDGDITSKG----GNLTIYSGGWV---DVHKN---ITLDQGFLNI----T 569
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ...----TINATNGKA 1164
: | : | : | : | : | : | : | : | OAVALGSASSNALSVRAGGALKAGKLS-ATGRLDVDGKQAVTLGSVASDGALSVSAGGNL 504
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                623 MTALGAIGVQAGGSVSAKDMRSRGAVTVSGGGAVNLGDVQSDGQVRATSAGAMTVRDVAA 682
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        683 AADLALQAG-----DALQAGFLKSAGAMTVNGR-----DAVRLDGAHAGGQL--RVSSD 729
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               730 GQAALGSLAAKGELTVS-AARAATVAELKSLD----NISV----TGGERVSVQSVNSASRV 781
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ---GLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNT 730
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  875
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           829 ISILGG-NVTLGGQNSSSI----TGNITIEKA---ANVTLEA-----NNAPNQQN 871
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          LHVQGGEHLDLGTLAAVGAVDVNGTGDVRVAKLVSDAGADLQAGRSMTLGIVDTTGDLQA 992
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         872 IRDRVIKLGSLLVNGSL-----SLTGENADIKGNLTISESATFKGKTRDTLNIT-GNFT 924
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        NNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQRSI-----IGGDIINKKGSLNITD 978
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  471 -SDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTV----NSSINIGSNSHLILHS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        570 AASVAFEGGNNKARDAANAKIV-AQGTVTITGEGKDFRANNVSLNGTGKGLNIISSVNNL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       629 THNLSGTINISGNITINQTTRKNTSYWQTSHDSHWNVSALNLETGANFTFIKYISSNSK-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ----QARSLADISLGAEGGATL------GAVEAAGSIDVRGGSTVAANSLHANRD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    783 -HVRGDDAFKI------NKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   876 VRVSGKDAVRVTAATSGGGLHVSSGRQLDLGAVQARGALAL---DGGAGVALQSAKASGT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            SKPLPIRFLANIT -- ATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTLNS----
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ITAKNVEVNKDITSL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ::<del>:</del>:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  -
-
-
-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  -
--
-
```

```
54;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              422 --IKINHADIHSTGRLFFITSLQNEKDSQSDITITDSKINLGNGAMGLGRSLDKENCDNQ 479
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           758 HSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDG 817
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            698 HQGY------ 723
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             818 YARNAINSTYNISILGGNVTLGGQNSSSSITGNITIEKAANVILEANNAP----NQQNIR 873
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              724 ----AINT------GGR-----TGKEVI-----INGAPGSIDNDANIA 751
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            874 DRVIKLGSLLVNGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINI 933
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              934 TQGV-VKLGNVTNDGDLNITTHAKRNQRSIIGGDI-INKKGSLNITDSNNDAEIQIGGNI 991
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               786 SKGVEIEVNPNSNFTFFELPREKNFNQTKIKGDSTKLSERGFARLYDKINGVR---ASNL 842
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             474 KKNSELKTTLTNTTISNYLKNAWTMNITASRKLTVNSSINI----GSNSHLILHSKGQRG 529
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            530 GGVQID-GDITSKGGNLTIYS-GGWVDVHKNITLDQGFLNITAASVAF------575
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              576 -----EGGNNKARDAANAKIVAQ--GTVTITGEGKDFRANNVSLNGTGKGLNIIS----SV 625
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            480 RWCRIETSQRKKFDVHMRNVVFDQVDDVVVAGGFKKVNLDNIV--ATGKTNFYIDGGVSR 537
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             626 NNLTHNLSGTINISGNITINQTTRK------NTSYW------QTS 658
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        538 NNSRYEY-GVLDLDKRTLLSELDQRRRRWKYYNDLDLDMNKAYWHRFDMFATKNTGRSTI 596
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            659 HDSHWNV--SALNLETG------ANFTFIKYISSNSKGLTTQYRSSAGVNF 701
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       597 KDTEINISNSKINLKNGFVHLLAEKIKLDNSKIDITFDK---DNSQDISTQ-----INR 647
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           702 NGVNGNMSFNLKEGAKVNFKLK----PNENMNTSKPLPIRFLANITATGGGSVFFDIYAN 757
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            648 LGMNGKVSM-----VNSHIKIVGDEKSDISAKAPYATMFLIGELIGEKSSIF---VKS 697
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             752 NMAFTIGD---NANTKTTIENAD--------ITALAPNGGTAYLS- 785
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           355 GDERGEGKNGIQLAKKTSLEKGS-TINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAK 413
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            291 ---TNEPKNKIKITSQTGSKVTSPKINFTGKSV-------NIN----GDFGR 328
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           414 TGGFVETSGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDP 473
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            329 D----DSKAH--YNEEHKRLDTE-----VNIDVPDNENIRIAEKDNTGTGTGTD- 371
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        372 -----SFIQTGALSSLLANNGKVNL-KGKDVNISGRIHIDSFRGSDSLLKLTNQGH-- 421
                                                                                                                                                72 QGMDVVHGTATMQVDGNK-TIIRNSVDAIINWKQFNIDQNEMVQFLQENNNSAVFNRVTS 130
                                                                                                                                                                                                                                                                               147 RKLKDGOVVKEGOVINKGKIK-AKD-FVVLNGDKVINEGEIDATNNGKVYLSSGYNFTFT 204
                                                                                                                                                                                                                                                                                                                                                                                                                                             241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              205 LSD-----SSISVALEDNAVQSI------VQNEGII-------KAGDIT 235
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            301 LSAKEGEAEI-----GGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLG 354
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          236 LNAKGRNQALDSLVMNNGVLEATKVSNKNGKVVLSADDVQLNNKS--DIKGE--SEVVF- 290
                                                                                                                                                                                                                                            131 NQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDI----SNENIKARNFTF 186
                                                                                                                                                                                                                                                                                                                                              187 EQTKDKAL---AEIVNHGLITVGKDGSVNLIGGKVKNEGVI-SVNGGSISLLAGQK--IT 240
                                                                                                  Conservative 153; Mismatches 347; Indels 308; Gaps
                                                                                                                                                                               Length 905;
905 AA; 98833 MW; 2424013EB437A99D CRC64;
                                                   6.3%; Score 466; DB 1; 23.7%; Pred. No. 2.5e-12;
                                                                             Similarity
                                                                                Best Local Sim
Matches 251;
        SEQUENCE
                                                            Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Ωÿ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     рр
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Dρ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δλ
```

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bioinformatics and the EMBL outstation—the European Bioinformatics Institute. There are no restrictions on its use by non-profit institutions as long as its content is in no way
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   modified and this statement is not removed. Usage by and for commercial entities requires a license agreement (See http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Alba H., Baba T., Fujita K., Hayashi K., Inada T., Isono K., Itoh T., Kasal H., Rashimoto K., Kimura S., Kitakawa M., Kitagawa M., Makino K., Mit T., Mizobuchi K., Mori H., Mori T., Motomura K., Nakamdra Y., Nashimoto H., Nishio Y., Oshima T., Saito N., Sampei G., Seki Y., Sivasundaram S., Tagami H., Takeda J., Takemoto K., Takeuchi Y., Wada C., Yamamoto Y., Horiuchi T., A 570-kb DNA sequence of the Escherichia coli K-12 genome corresponding to the 28.0-40.1 min region on the linkage map.";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     MEDLINE-94100243; PubMed-8274505; Cartwright P.J., Timms M.W., Lithgow T., Hoej P.B., Hoogenraad N.J.; "An Escherichia coli gene showing a potential ancestral relationship to the genes for the mitochondrial import site proteins ISP42 and
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Biochim. Biophys. Acta 1153:345-347(1993).
--- SUBCELLUIAR LOCATION: Attached to the membrane by a lipid anchor (Potential).
---- SIMILARITY: TO E.COLI YFAL.
---- SIMILARITY: SOME, TO FUNGAL MITOCHONDRIAL IMPORT SITE PROTEINS
                                                                                                                                                                                                                                                                                                                                                                                          MEDLINE-97426617; PubMed-9278503; Blattner F.R., Plunkett G. III, Bloch C.A., Perna N.T., Burland V., Riley M., Collado-Vides J., Glasner J.D., Rode C.K., Mayhew G.F., Gregor J., Davis N.W., Kirkpatrick H.A., Goeden M.A., Rose D.J.,
                                                                                                                                                                                                                                                                                 Bacteria; Proteobacteria; gamma subdivision; Enterobacteriaceae;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -1- CAUTION: REF.3 SEQUENCE DIFFERS FROM THAT SHOWN DUE TO A FRAMESHIFT IN POSITION 653.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         "The complete genome sequence of Escherichia coli K-12."; Science 277:1453-1474(1997).
992 SQKEGNLTISSDKINITKQITIKKGIDGEDSSSDATSNA 1030
                     YDEK_ECOLI STANDARD; PRT; 1325 AA. P32051; P76140; P77168; O1-OCT-1993 (Rel. 27, Created) O1-NOV-1997 (Rel. 35, Last sequence update) 16-OCT-2001 (Rel. 40, Last annotation update) Hypothetical lipoprotein ydek precursor (ORFT).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      PIR; S34315, S34315.
EcoGene; EG11780; ydeK.
PROSITE; PS00013; PROKAR_LIPOPROTEIN; 1.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    D90793; BAA15190.1; ALT_INIT.
D90794; BAA15197.1; ALT_INIT.
X73295; CAA51730.1; ALT_FRAME.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  MEDLINE-97251357, PubMed-9097039;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               EMBL; AE000248; AAC74583.1; -
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         DNA Res. 3:363-377(1996).
                                                                                                                                                                                                                                                                                                                                                        SEQUENCE FROM N.A.
STRAIN-K12 / MG1655;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ISP42 AND MOM38.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                   Gregor J., Davis
Mau B., Shao Y.;
                                                                                                                                                                                                                                                                   Escherichia coli
                                                                                                                                                                                                                                                                                                                       NCBI_TaxID=562;
 ò
                                                                                                                                                  a
```

```
74;
                                                                                                                                                                                                Conservative 202; Mismatches 544; Indels 431; Gaps
                                                                                                                                                                                                                                                                                                      61 SIPQSVLASGLQGMDVVHGTATMQVDGNK-TIIRNSV--DA-IINWKQFNIDQNEMVQFL 116
                                                                                                                                                                                                                                                                                                                                                                                                              97 AGGNAS-----LITITISVIGANEDSEGTV-------NVLGGTWRLYDSGN 135
                                                                                                                                                                                                                                                                                                                                                                          117 QENNNSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISN 176
                                                                                                                                                                                                                                                                                                                                                                                                                                                177 ENIKARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAG 236
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                136 --- NARPLNVGQSGTGTL-NIKQKGHV---- DGGYLRLGSSTGGVGTVNVEG----- 179
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    237 QKITISDIINPIITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKS 296
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        180 ----EDSVLTTELFEIGSYGTGSLNITD----KGYVTSSIVAILGYQAGSNGQVVVEKG 230
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          297 GNIVLSAKE-----GEAEI--GGVISAQNQQAKGGKLMITGDKVTLKTGAVID 342
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            343 LSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGN 402
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  267 -----TIIGGNATGIGTLNVQ------DQDSVITVRRLYNGYFG------NGT 302
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    303 VN------ISNNGLINNKEYSLVGVQDGSHGVVNVTDKGHWNFL 340
                                                                                                                                                                                                                                1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                           403 INAQGSGDIAKTGGFVETSGHDLFIKDNAIVDAKEWLL----DFDNVSINAEDP-LFNNT 457
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        458 GINDEFP-TGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTV--NSSINI 514
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          341 GTGEAFRYIYIGDAGDGELNVSSEGKVDSGIITAGMKETGTGNITVKDKNSVITNLGTNL 400
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                515 GSNSHLILHSKGQRGGGVQIDGDITSKG-----GNLTIYSGGWVDVHKNITLDQGFLNI 568
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     569 TAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLNIISSVNNL 628
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              629 THNL----SGTINISGNITINQT-----TRKNTSYWQTSHDSHWNVSALNLETGANFT 677
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 678 FIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIR 737
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   546 -LKTSSTNAQLLQV------GVLGTGELNITTGGTVKAR-----DTQIALNDK 586
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       738 FLANITATGGGSVF--FDIYANHSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKD 795
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              L-----TIN-----ATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLG 839
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             632 LGVFEPAVGTLNIGAAHGEAAADAGFITNATKVEFGLGEGVFVFNHTNNSD-----A 683
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              499 GINVGNFGSGIVNVSNGATLNSTGYGFIGGNASGKGIVNISTDSLWN-------
                                                                                                                                                                  Score 441.5; DB 1; Length 1325;
                                                    HYPOTHETICAL LIPOPROTEIN YDEK.
N-ACYL DIGLYCERIDE (POTENTIAL).
N -> K (IN REF. 3).
M -> S (IN REF. 3).
W : 26A3A066FA19AD7D CRC64;
Hypothetical protein; Membrane; Lipoprotein; Signal;
                                         POTENTIAL.
                                                                                                                                                                                       .
02
                                                                                                                                                                                       Pred.
                                                                                                                          1325 AA; 136514 MW;
                                       1325
1325
19
                                                                                        884
1317
                                                                                                                                                                                 Similarity
                  Complete proteome.
                                                                                        884
1317
                                                                                                                                                                                              Matches 326;
                                                                                                                            SEQUENCE
                                                                                          CONFLICT
                                                                                                                                                              Query Match
                                                                                                         CONFLICT
                                                                                                                                                                                   Local
                                       SIGNAL
                                                        CHAIN
                                                                       LIPID
   KW
FT
FT
FT
SQ
                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                        δŏ
                                                                                                                                                                                                                                                                                                                                        q
                                                                                                                                                                                                                                                                                                                                                                            à
                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
```

```
1037 GQNDYQGATYVQMGTLRTDADGALGNTRELNISNAAIVDLNGS-----TQTVETFTGQM 1090
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          993 IHGGOKLTL-----AEHGGA--YGATADMSAKIGGEG-----DLAINTVRQVSLSN 1036
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1203 GEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGA--EINATEGAATLTATGNTLTTEA 1260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1261 GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1091 GSTVLFKEG-----ALTVNKGGI---SQGELT--GGGNLNVTGGTLAIEGLNAR 1134
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1321 INGDAS-GDSTEVNAVNASGSGSVTAATSSSV---NITGDL-NTVNGLNIISKDGRNTVR 1375
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1135 YNALTSISPNAEVSLDNTQGLGRGNIANDGLLTLKNVTGELRNSISGKGIVSATARTDVE 1194
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   987 IG----GNISOKEGNLTISSDKINITKOITIKKGIDGEDSSSDATSNANLTIKTKELKLT 1042
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1043 EDLSISGFNKAEITAKDGRD-----LTIGNSNDGNSGAE---AKTV----TFN 1083
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1084 NVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKN-VEVNKDITSLKTVN 1142
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1143 ITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEAKS 1202
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 30-MAY-2000 (Rel. 39, Created)
30-MAY-2000 (Rel. 39, Last sequence update)
30-MAY-2000 (Rel. 39, Last annotation update)
16-CCT-2001 (Rel. 40, Last annotation update)
0uter membrane protein B precursor (168 kDa surface-layer protein)
(Surface protein antigen) (Cell surface antigen 5) (Sca5) (TompB)
(romp B) [Contains: 120 kDa surface-exposed protein (Surface protein antigen) (120 kDa outer membrane protein ompB); 32 kDa beta peptidel.
                                                                                                                                                                                                                                                                      733 ADGVTGMGSSEVTIANPGTLDILASTNSAGDYTLTNALKGDGLMRVQLSSSDKMFGFTHA 792
                                                                                                                                                                                                                                                                                                                                                                                                                                                         793 TGTEFAGVAQLKDSTFTLERDNTAALTHAMLQ-------SDSENTTSVK 834
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  835 VGEQSIGGLAMNGGTIIFDTD----IPAATLAEGYISVDTLVVGAGDYTWKGRNYQVNGT 890
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          891 GDVLID------VPKPWNDPMANNPLTTLNLLEHDDSHVGVQLVKAQTVIGSGGSLTLR 943
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       944 DLOGDEVEAD-----KTLHIAQNGTVVAEGDYGFRLTTAPGNGLYVN---YGLKALN 992
                                                                                         684 GYOVDMLITGD---DKDGKVIHDAGHTVFNAGNTYS------GKTLVNDGLLTIASHT 732
840 GONSSSSITGNITIEKAANVTLEAN----NAPNOONIRDRVIKLGSLLVN-GSLSLTGEN 894
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   MEDLINE-92167802; PubMed-1724278; Galmore R. D. Jr., Cleplak W. Jr., Policastro P.F., Hackstadt T.; Caglak W. Jr., Policastro P.F., Hackstadt T.; The 120 kilodalton outer membrane protein (rOmp B) of Rickettsia rickettsii is encoded by an unusually long open reading frame: evidence for protein processing from a large precursor."; Mol. Microbiol. 5:2361-2370(1991).
                                                                                                                                                                                                                                                                                                                                                                936 -----GVVKLGNVTNDGDLNIT---THAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Bacteria; Proteobacteria; alpha subdivision; Rickettsiales;
Rickettsiaceae; Rickettsieae; Rickettsia.
                                                                                                                                                                                        895 ADIKGNLTISESATFKGKTRDTL --- NITGNFT ---- NNGTAEINITQ ---
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PRT; 1654 AA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SEQUENCE OF 279-1654 FROM N.A. STRAIN-R;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             STANDARD;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Rickettsia rickettsii.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          _TaxID=783;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1376 LRG 1378
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1195 LDG 1197
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             OMPB_RICRI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ID DATE OF THE SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND SECOND S
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Ор
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δy
                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                          ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
```

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bloinformatics and the EMBL outstation the European Bloinformatics Institute. There are no restrictions on its use by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial entities requires a license agreement (See http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch).
       467 GVVQLSGTHAAELRLGNAGSIFKLADGTVINGKVNQTALVGGALAAGTITLDGSATITGD 526
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      355 MVIQSANATGOVNFRHIVDVGADGTTAFKTAASKVTITQDSNFGNTDFGNLAAQIKVP-- 412
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               413 NAITLTGNF---TGDASNPGNTAGVITFDANGTLESASADA---NVAVINNITAIEASGA 466
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ------5GVQIDGD 537
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              88 -NKTIIRNSVDAIINWKQFNIDQNEMVQFLQENNNSAVFNRVTSNQISQLKGILDSNGQV 146
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            147 FLINPNGITIGKDAIINTNGFTASTLDISNENIKARNFTFEQTKDKALAEIVNHGLITVG 206
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     101 -----AVTVSED---TTLGF----ITNVVHNAHSFNLTLNAGKTL-----TIT 136
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          207 KDGSVNLIGGKVKNEGVISV---NG------GSISLLAGQKITISDIINPTITYS 252
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                137 GQGVTNAQAAATKNAQNVVVQFNNGAAIDNNDLKGVGRIDFGAPASTLVFNLANPT--- 192
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           253 IAAPENEAVNLGD--IFAKG--GNINVRAATIRNQGKLSADSVSKDKSGNIVLSAKEGEA 308
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 193 ----TQKAPLILGDNAVIANGVNGTLNVTNGFI----QVSNKSFATVKAINI-----A 237
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         309 EIGGVI-----SAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETY----LGG 355
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           238 DGQGIIFNTDANNANTLNLQAGGTTINFTG---TDGTGRLVLLSKHAAATNFNITGSLGG 294
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        356 DERGEGK-NGIQLAKKTSLEKGSTINVSGKEKG----GFALVW--GDIALIDGNI---- 403
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              295 NLKGVIEFNTVAVDGQLTANAGAANAVIGTNNGAGRAAGFVVSVDNGKVATIDGQVYAKD 354
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        404 -----NAQGSGD---IAKTGGFVETSGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLF 454
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      455 NNTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTVNSSINI 514
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                34 SEKPARMKVRHLALKPLSAMLLSLG----VTSIPQSVLASGLQGMDVVHGTATMQVDG-- 87
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2 AQKPNFLK-----KLISAGLVTASTATIVASFAGSAMGAAIQQNRTTNGAAT-TVDGAG 54
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Query Match 5.8%; Score 429.5; DB 1; Length 1654; Best Local Similarity 22.1%; Pred. No. 1.6e-10; Matches 357; Conservative 179; Mismatches 583; Indels 493;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   120 KDA SURFACE-EXPOSED PROTEIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            D7AB70FB7087F618 CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        32 KDA BETA PEPTIDE.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         POLY-THR.
                                                                                                                                                                                                                                                                                                                                                                                                                     InterPro; IPR003858; rompA_rompB.
Pfam; PF02708; rompA_rompB; 1.
Pfam; Pr04708; rompA_rompB; 1.
CHAIN 1333 120 K
MEDLINE=90136087; PubMed=2515418;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            515 G----SNSHLILHSKGQRG-----
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1654 AA; 168184 MW;
                                                                                                                                                                                                                                                                                                                                                                                                    EMBL; X16353; CAA34403.1; -.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1188
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1334
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   SEQUENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                DOMAIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     d
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Ωý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              óλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
```

-NLTIYSGGWUDVHKNITLDGGFLNITAASVAFEGGNNKAKDAAN 587 	62	QFNIGS NFTFIKYISSNS	KGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFL 739	TINGHVDCDDABKTMEDTER	AGGTNI-VSGTVGGQGNKFNTVAL 767	INATNSNESLRQTKDDEYDGYARNAINSTYNISILGGNYTLGGONSSSSITGN 850 	VNGSLSLTGENADIKGNLTISESA  :      :  :  :  :  :  :  :  :  :  :  :	94	98	ANLTIKTKE 10 : :  OGVTVTTG- 10	LKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVT 1098 	LNSKVKTSSSNGG	TSLKTVNITASEKVTTTAGSTINATNGKASITTKTGDI-SGTIS-GNTVSVSATVDLTTK 1193 	GGTISGNTVNVTANAGDLTVGNGAEINATEG 1245  :	GOVDLLAQNGSIAGSINAANVTLNTTGTLTT 129 :	VAGSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSV 1351 	) )
ITSKGGNLTIYSGGWVDVH   :    :     IGNAGGAALQRITLANDAK	AKIV	NLTHNLSGTINISGNITINQTTRK       :     :     :     :     :	KGLTTQYRSSAGVNFNG	ILAAGINLGSAINPLAEINFGSKGVNVDTVLNVGEGVNL ANITATGGGSVFFDIYANHSGRGAELKMSFINISMGANF		INATNSNFSLRQTKDDFYDGYARN	ITIEKAANVTLEANNAPNQQNIRDI 	TFKGKTRDTL	GNVTNDGDLNITTHAKRNQRSIIG-   :     :  :    GVDSVIADGQVIGDQNNIVGLA	QIGGNISQKEGNLTISSDKI :   :   :   :   TLSGGVPNTPGTVYGLGTGIGASKE	LKLTEDLSISGFNKAEITAKDGRDI  :  GEDGK-1	LNSKVKTSSSNGGS   :  : :    STSMIGTTKANNGTVTYLGNAFVGN	FSLKTVNITASEKVTTTAGSTINAT       IDFGTYNLGIVNSNIILGGGT-TAI	GT	AATLTATGNTLTTEAGSSITSTK 	VAGSDIKATSGTLVINAKDA :	IITGDLNTVNGLNIISKDGR: 
538	588	627	687	740	728	798	851	908	941	986	1039	1099	1136	1194 :	1246 2	1300 \	1352 N : 1320 D
Qy Dp	oy G	Qy Dp	OY 4	oy o	Db	Qy Db	Qy Dp	Qy Dp	Oy Dp	Qy Db	Qy	Oy Dp	Qy Db	Q <sub>y</sub>	Qγ	Oy Dp	Qy Db

PRT; 1953 AA.

BIGA\_SALTY STANDARD; P25927; P25928; Q9XCQ3;

A D

RESULT 12 BIGA\_SALTY

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bioinformatics and the EMBL outstation the European Bioinformatics Institute. There are no restrictions on its use by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial entities requires a license agreement (See http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch)
                                                                                                                                                                                                           SEQUENCE FROM N.A.
STRAIN-LT2 / SGSC1412 / ATCC 700720;
MEDLINE-21534948; Pubmed-11677609;
MEDLINE-21534948; Pubmed-11677609;
MCLelland M., Sanderson K.E., Spieth J., Clifton S.W., Latreille P., Courtney L., Porwollik S., Ali J., Dante M., Du F., Hou S., Layman D., Leonard S., Mayven C., Scott K., Holmes A., Grewal N., Mulyaney E., Ryan E., Sun H., Florea L., Miller W., Stoneking T., Nhan M., Waterston R., Wilson R.K.;
"Complete genome sequence of Salmonella enterica serovar Typhimurium
                                                                                                                                                                                                                                                                                                                                                                                                                                                                J. Bacteriol. 173:325-333(1991).
-!- CAUTION: Ref.3 sequence differs from that shown due to frameshifts in positions 414 and 732.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               STRAIN-LT2;
MEDLINE-91100301; PubMed-1987123;
MU J.Y., Slegel L.M., Kredich N.M.;
"High-level expression of Escherichia coli NADPH-sulfite reductase: regulrement for a cloned cysG plasmid to overcome limiting stroheme
                                                                             Bacteria; Proteobacteria; gamma subdivision; Enterobacteriaceae;
01-MAY-1992 (Rel. 22, Created)
15-JUN-2002 (Rel. 41, Last sequence update)
15-JUN-2002 (Rel. 41, Last annotation update)
Putative surface-exposed virulence protein biga precursor.
BIGA OR STM3478.
                                                                                                                              SEQUENCE FROM N.A.
STRAIN-ATCC 14028;
Stojiljkovic I., Valentine P., Heffron F.;
"Salmonella typhimurium rhs homolog.";
Submitted (MAR-1999) to the EMBL/GenBank/DDBJ databases.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        EMBL; AF133696; AAD39458.1; --
EMBL; AE008859; AAL22340.1; --
EMBL; M64606; AAA27042.1; ALT_FRAME.
EMBL; M64606; AAA27043.1; ALT_FRAME.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  8.
10.
11.
11.
113.
                                                                                                                                                                                                                                                                                                                                                                        SEQUENCE OF 1-765 FROM N.A.
                                                                                                                                                                                                                                                                                                                                              Nature 413:852-856(2001).
                                                                   Salmonella typhimurium
                                                                                                       NCBI_TaxID=602;
                                                                                            Salmonella.
                                                                                                                                                                                                                                                                                                                                                                                                                                                     cofactor.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               REPEAT
REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      REPEAT
```

	79;	0 4	9 6	3 2	v ŭ	7 2		53	23	76 39	32 67	68 27	11 84	50 34	05 82	54 034	4
244 252 15 (INCOMPLETE). 207 207 D -> DRGDDDYTPPDD (IN REF. 1). 514 514 A -> R (IN REF. 3). 1698 1698 D -> N (IN REF. 1). 1795 1798 QYLE -> ITLQ (IN REF. 1). 1836 1837 SA -> T (IN REF. 1). 1953 AA; 200150 MW; 611B3FIC954D9LAE CRC64;	5.8%; Score 429.5; DB 1; Length 1953; Similarity 20.4%; Pred. No. 2e-10; 6; Conservative 225; Mismatches 581; Indels 503; Gaps	GMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMYQFLQENNNSAVFNRVTSNQ 132 	ISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIKARNFTF 186   :  :	HGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLA 23:         : :	GQKITISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDK 29° 	SGNIVLSAKEGEAEIGGVISAONQQAKGGKLMITGDKV-TLKTGAVIDLSGKE 34' :1: :1 :	59	OGSGDIAKTGGFVETSGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEF 46  : :	PTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILH 52	KGQRGGGVQIDGDITSKGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFE 57: 	-GGNNKARDAANAKIVAOGTVTITGEGKDFRANNVSLNGTGKGLNIISSVNNLTHNL 63	INISGNITINOTTRKNTSYWQTSHDSHWNVSAL 66  ::   :  :  :  :  :  :  :  :  :  :  :  :	AANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFN7 7	SEDRAAITRASGESAVHNKAGGD1TLISDQTPQGSGGIEVYPLKWY 93	FFDIYANHSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNF 8C  :: : : :  :    :: : :    ::	YARNAINSTYNISILGGNVTLGGQNSSSSITGNITIE 8	NNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKGNLTISESATFKGKTR
REPEAT CONFLICT CONFLICT CONFLICT CONFLICT CONFLICT SEQUENCE	Query Match Best Local S Matches 336	73 GMDV   11 310 GWDV	133 ISQI 355 AHNS	87	236 GQK:       464 GSTC	296 SGN: : : 504 AGS	-	406 QGS	464 PTGTG   111 634 LNGTG	524 SKG  :  662 SEG	577 -GG   11 710 VGG	633 SGT    768 DGT	669 NLET :   828 YIPT	712 885 SNS	751 935 THT	- 90	ດ ທ
S S S S S S S S S S S S S S S S S S S	Quer Best Matc]	oy Db	Qy	Oy Dp	Oy Op	Qy Db	Qy	da	Qy Dp	Qy	Qy Db	Oy Db	Qy Dp	Qy	Qy Ph	yo g	oy o

```
1459 NGEINLLCDSGCDIYAPGTTGTQ-----NDHNGTADIVIPDATTAPTEGSIPTPPADPN 1512
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1293 TIGILIT-VAGSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVT----AA 1346
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1347 TSSSV----NITGDLNTVNGLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRV 1402
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1566 TCSNIQGADNITSTSVVWNAQGSQDADGNVDVTM-----TKNAYADVATDSSVSDVAQA 1619
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1403 LEKVKDLSDEERETLAKLGV----SAVRFVEPNNTITVNTQ-----NEFTTRPSSQVII 1452
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1193 KSGSKIEAKSGEANVTSATGTIGGTISGN--TVNVTANA-------GDLT--VGN 1236
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1399 SGTINVGTEQGKEDGTNGTGLIGIKGNGNATTINNTADGVINVYADDSYAFGGKTKAIIN 1458
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1237 GAEIN-ATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIA---GSINAANVTLN 1292
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    OgrkA3; Ogrk98; Ogrc45;
16-OCT-2001 (Rel. 40, Created)
16-OCT-2001 (Rel. 40, Last sequence update)
15-UN-2002 (Rel. 41, Last annotation update)
Outer membrane protein B precursor (168 kDa surface-layer protein)
(Surface protein antigen) (Cell surface antigen 5) (Sca5) (rOmpB)
(rOmp B) (Contains: 120 kDa surface-exposed protein (Surface protein antigen) (120 kDa outer membrane protein ompB); 32 kDa beta peptide).

OMPB OR RC1085.
                                                                                                                                                                                                                                                                                                        1057 AKDGRDLTIGNSND--GNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRES 1114
                                                                                                                                                                                                                                                                                                                                               1238 -----DVTFYNNGDFTGSIAGTSYQQEIVNTGDMTVAEDGKSLV-----SGSFYF 1282
                                                                                                                                                                                                                                                                                                                                                                                         1115 NSDNDTGLTITAKNVEVNKDITSLKTVNIT-ASEKVTTTAGSTINATNGKASITTKTGD- 1172
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1173 -----ISGTISG-----TVDLTT 1192
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1339 DPKWIWNTATGVINGINPDAPLINLGRGYNFGNQGTINVQGDNAVAISGGTSSYVINLVN 1398
                                                                                              1066 QADELVGMAALNGGVVINDTSGVINIDADYGQAFLSDSSSYIINNGSINLNGSPMDDTDS 1125
                                                                                                                                          962 IIGGDIINK-----KGSLNITDSNNDABIQIGGNISQKEGNLTISSD------ 1003
                                                                                                                                                                                 1126 HMGGTPTDKIWIQSLPGSGDSDTRTSDTGFFTAGTLA-NYGTETLNGDVDVNGGWLYNEA 1184
                                                                                                                                                                                                                           1004 --KINITKQITIKKGIDGEDS----SSDATSNANLTIKTKELKLTED-LSISGFNKAEIT 1056
                                                                                                                                                                                                                                                                  1185 GASLTVNGTVTINGGANALANYGTLDADAISTWHSLFNEADGSITTDLLTLNG----- 1237
1035 ------nnag------FGMMALNGGTAINQGVITLTAD---DGVTG 1065
                                                          915 DTLNITGNFTNNGTAEINITQGVVKL-------GNVTNDGDLNITTHAKRNQRS 961
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           STRAIN-Walish 7;
BEDLINE-21442074; PubMed-11557893;
Ogata H., Audic S., Renesto-Audiffren P., Fournier P.-E., Barbe V.,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Bacteria; Proteobacteria; alpha subdivision; Rickettsiales;
Rickettsiaceae; Rickettsieae; Rickettsia.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PRT; 1655 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1453 SEGKACFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1678 KDGLA------FNVVAKGDP 1691
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Rickettsia conorii.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           NCBI_TaxID=781;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             RESULT 13
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ДQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         οy
                                                                                                                                                                                        qq
                                                                                                                                                                                                                                  òγ
                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                  Qχ
                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                   Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                       Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
```

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bioinformatics and the EMBL outstation the European Bioinformatics Institute. There are no restrictions on its use by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    entities requires a license agreement (See http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          79;
                                                                                                                                                                                                                                                           Stenos J., Walker D.;
"The rickettsial outer membrane protein A and B genes of Rickettsia australis, the most divergent rickettsia of the spotted fever group."; Submitted (MAY-1999) to the EMBL/GenBank/DDBJ databases.
-- FUNCTION: THE LIO KDA SURFACE-EXPOSED PROTEIN IS A MAJOR STRUCTURAL PROTEIN WHICH MAY PLAY A ROLE AS A RICKETTSIAL VIRULENCE FACTOR AND/OR IMMUNOGEN DURING INFECTION (BY
                                                                                                                                                                                                                                                                                                                                                                                                                                SUBCELLULAR LOCATION: CELL WALL. THIS BACTERIUM IS COVERED BY A S-
                                                                                                                                                                                                                                                                                                                                                                                                -!- FUNCTION: THE 32 KDA BETA PEPTIDE MAY SERVE AS A MEMBRANE ANCHOR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               120 FACE - EXPOSED PROTEIN.

120 FACE - EXPOSED PROTEIN.

32 KDA BETA PEPTIDE.

G -> A (IN STRAIN INDIAN TICK TYPHUS).

K -> N (IN STRAIN INDIAN TICK TYPHUS).

V -> A (IN STRAIN INDIAN TICK TYPHUS).

N -> D (IN STRAIN INDIAN TICK TYPHUS).

I -> V (IN STRAIN INDIAN TICK TYPHUS).

A -> I (IN STRAIN INDIAN TICK TYPHUS).

R -> L (IN STRAIN INDIAN TICK TYPHUS).

R -> L (IN STRAIN INDIAN TICK TYPHUS).

KD -> GH (IN REF. 3).

F -> S (IN REF. 3).

G -> S (IN REF. 3).

H -> R (IN REF. 3).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    -----NKTIIRNSVDAIINWKQFNIDQNEMVQFLQENNNSAVF 125
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               55 FDQTAVPANVAVPLNAVITAGVNKGITLNTPAGSFNGLFLNTANNLDVTVREDTTLGFIT 114
                                  "Mechanisms of evolution in Rickettsia conorii and R. prowazekii.";
Science 293:2093-2098(2001).
                                                                                                                                                       "Phylogenetic analysis of members of the genus Rickettsia using the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             34 SEKPARMKVRHLALKPLSAMLLSLG----VTSIPQSVLASGLQGMDVVHGTATMQVDG-- 87
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             2 AQKPNFLK-----KLISAGLVTASTATIVASFAGSAMGAALQQNRTINAVAT-TVDGVG 54
Samson D., Roux V., Cossart P., Weissenbach J., Claverie J.-M.,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Conservative 194; Mismatches 617; Indels 414;
                                                                                                                                                                                                                                                                                                                                                                                                                                               LAYER WITH HEXAGONAL SYMMETRY (BY SIMILARITY).
-1- SIMILARITY: BELONGS TO THE RICKETTSIAE OMPA/OMPB FAMILY.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Length 1655;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              E49E19377D5FCE37 CRC64;
                                                                                                                                                                       gene coding the outer-membrane protein rompB (ompB)."; Int. J. Syst. Evol. Microbiol. 50:1449-1455(2000).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            EMBL; AF149110; AAD39533.1; -.
InterPro; IPR003858; rOmpA_rOmpB.
Pfam; PF02708; rOmpA_rOmpB; 1.
Antigen; S-layer; Cell wall; Complete proteome.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  DB 1;
                                                                                                    STRAIN-Indian tick typhus, and Malish 7;
MEDLINE-20393643; PubMed-10939649;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               5.8%; Score 428;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Š.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Pred.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                168342 MW;
                                                                                                                                                                                                                        SEQUENCE OF 353-1655 FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         EMBL; AE008659; AAL03623.1; -.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               AF123721; AAF34124.1; -. AF123726; AAF34129.1; -.
                                                                                   SEQUENCE OF 33-1649 FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1334
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1159
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1492
                                                                                                                                          Roux V., Raoult D.;
                                                                                                                                                                                                                                                                                                                                                                                                                      BY SIMILARITY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                AA;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Local Similarity
les 348; Conserv
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1655
                                                                                                                                                                                                                                              STRAIN=Malish
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          SEQUENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 CHAIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Matches
ö
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Ω
```

```
126 NRVTSNQISQLKGILDSNGQVFLINPNGIT------IGKDAIINTN---- 165
                                           115 NVV--NNANHFNLMLNA-GKTLLTTGGGITNVQAAATKNANNVVAQVNNGAAIDNNDLQG 171
                                                                                                          -----GFTASTLDISNENIKARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGG--K 217
                                                                                                                                                              172 VGRIDCGAAASTLVFNLAN------PTTQKAPLILGDNAVIVNGANGTLNVTNGFIK 222
                                                                                                                                                                                                                                                       218 VKNEGVISVNGGSISLLAGQKITISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRA 277
                                                                                                                                                                                                                                                                                                                               278 ATIRNQGKLSADSVSKDKSGNIVLSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKT 337
                                                                                                                                                                                                                                                                                                                                                                                                                                         338 GAVI-DLSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDI 396
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ALIDGNINAQGSGDIAKTGGFV-ETSGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFN 455
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     362 AV--GQVNFRHIVDVGTDGTTAFKTAASKVALTQNSNFGT----TDFGNLAAQIIVP--N 413
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             305 VAVNGOLKANAGANAAVIGTNNGAGR---AAGFVVSVDNGKVATIDGOVYAKDMVIQSAN 361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           456 NTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIG 515
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            414 TMTLNGNF---TGDASNPGNTAGVITFDANGTLASASADA---NVAVTNNITAIEASGAG 467
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   516 ----SNSHLILHSKGQRGGVQI-DGDITSKGGNLTIYSGGWVDVHKNITLDQGFLNIT- 569
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             570 ----AASVAFEGGNNKARDAANAKIVAQGTVTITGEGK----DFRANNVSLNGTGKGLNII 622
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   526 DIGNAGGAAALQGITLANDA--TKTLTLGGANIIGANGGTINFOANGGTIKLTSTQNNIV 583
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         584 VDFDLAIATDQTGVVDASSLTNAQTLTINGKIGTVGANNKTLGQFNIGSSKTVLSDGDVA 643
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1005 INITKQITIKKGID--GEDSSSDATSNANLTIKTKEL-----KLTEDLSISGFNKAEI 1055
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   991 F---KQVTFTTDYNNLGNIIATNATINDGYTVTTGGIAGIGFDGKITLG-SVNG--NGNV 1044
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1056 TAKDGRDLTIGNSNDGNSGAEAKTVTF-----NNVKDSKISADGHNVTLNSKVKTSSSN 1109
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            644 INQTTRKNTSYWQTSHDSHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNG 703
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                644 INELVIGNNGAVQFAHNTYLITRTINAAGQGKIIFNPVVNNNTTLAT-----GTNLGS 696
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           QRSIIG-----GDIINKKGSLNI---TDSNNDAEIQIGGNISQKEGNL----TISSDK 1004
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       704 VNGNMSFNLKEGAKVNFKLKPNEN----MNTSKPLPIRFLANITATGG--GSVFFDIYAN 757
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          697 ATNPL-----AEINFGSKGAANVDTVLNVGKGVNL-YATNITTTDANVGSFIFN---- 744
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              758 HSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDG 817
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      818 YARNAINSTYNISILGGNVTLGGQNSSSSI-----TGNITIEKAANVTLEANNAPNQQ 870
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               785 NTTIAANSTLQI----GGNYTADFVASADGTGIVEFVNTGPIT-----VTLNKQAAP--- 832
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  745 -------AGGINI-VSGIVGGQQGNKFNTVALDNGTTVKFLGNAT----FNG 784
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   871 NIRDRVIKLGSLLVNGSLSLTGENADIKGNLTISE---SATFKGKTRDTL----- 917
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ----VNALKQITVSG------PGNVINEIGNAGNYHGAVTDTIAFENSSLGAV 876
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -----NITGN------FTNNGTAEINITQGVVKLG--NVTNDGDLNITTHAKRN 958
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            931 QNNIVGLGLGSDNDIIVNATTLYAGIGTINNNQGTVTLSGGIPNTPGTVYGLGTGIGASK 990
                                                                                                                                                                                                                                                                                                                                                                                     261 ATITFNG-----TDGTGRLVLLSKNAAATDFNVTGSLGGNLKG-----IIEFNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         468 VVQLSGTHAAELRLGNAGSVFKLADGTVINGKVNQTALVGGAL-AAGTITLD-GSATITG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         TINDSINIEDSI------
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 877 VFLPRGIPFNDAGNRIPLTIKSTVGNKTATGFDVPSVIVLGVDSVIADGQV----IGD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ---SSVNN---LTHN----
                                                                                                                                                           q
                                                                                                          δλ
                                                                                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       셤
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ð
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      g
```

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bioinformatics and the EMBL outstation the Buropean Bioinformatics institute. There are no restrictions on its use by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial entities requires a license agreement (See http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch).
                                                                                                                                                1170 TGDI-SGTIS-GNTVSVSATVDLTTKS-GSKIEAKSGEANVTSATGTIGGTISGNTVNVT 1226
                                                                                                                                                                                                                              1227 ANA----GDLT---VGNGAEINATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNG 1278
                                                                                                                                                                                                                                                                     1194 DNANANFSGTOTYTLIOGGARFNGTLGGPNFVVT-----GSNRFVNYGLIRAANODY 1245
                                                                                                                                                                                                                                                                                                               1279 SIAGSINAANVTLNTTGTLTTVAGSDIKATSG-----TLVINAKDAKLNGD----ASGDST 1330
                                                                                                                                                                                                                                                                                                                                                      1246 VITRTNNAENVVTN-----DIANSSFGGAPGVGONVTTFVNATNTAAYNNILLAKNSAN 1299
                                                                                                                                                                                                                                                                                                                                                                                                  1331 EVNAVNASGSGSVTAATSSSVNITGDL-----NTVNGLNIISKDGRNTVRLRGKEIEVKY 1385
                                                                                                                                                                                                                                                                                                                                                                                                                                       1300 SANFVGAIVTDTSAAITNAQLDVAKDIQAQLGNRLGALRYLGTP--ETAEMAGPEAGA-- 1355
1045 RFVDG-ILSHSTSMIGTTKANNGTVTYLGNAFVGNIGDSD-----TPVASVRFTGSD 1095
                                                             1110 GGRESNSDNDTGLTITAKNVEVNKDITSLKTVNITASEKVTTTAGSTINATNGKASITTK 1169
                                                                                                      1096 GG-----AGL----QGNIYSQVIDFGTYNLGISNSNVILGGGT-TAINGKINLRTN 1141
                                                                                                                                                                                     1142 TLTFASGTSTWGNNTSIETTLTLANGNIGNIVILEGAQVNATT-TGT-----TTIKVQ 1193
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             MEDITINE-88257037; PubMed=3290200;
Poole K., Schiebel E., Braun V.;
"Molecular characterization of the hemolysin determinant of Serratia
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 FUNCTION: CELL-BOUND HEMOLYSIN, WHICH RELEASES HEME-IRON FROM ERYTHROCYTES BY INTERACTION WITH THE ERYTHROCYTE MEMBRANE. SHLA REQUIRES SHLB FUNCTION.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       CELL MEMBRANES AND CAUSE CELL RUPTURE BY MECHANISMS NOT CLEARLY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Bacteriol. 170:3177-3188(1988).
FUNCTION: BACTERIAL HEMOLYSINS ARE EXOTOXINS THAT ATTACK BLOOD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Serratia marcescens.
Bacteria; Proteobacteria; gamma subdivision; Enterobacteriaceae;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SEQUENCE 1608 AA; 165078 MW; D669B476FE7DAD51 CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   SUBCELLULAR LOCATION: Outer membrane. SIMILARITY: TO P.MIRABILIS HEMOLYSIN (HPMA).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               01.APR-1990 (Rel. 14, Created)
01.APR-1990 (Rel. 14, Last sequence update)
NOV-1990 (Rel. 16, Last annotation update)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            [1]
SEQUENCE FROM N.A., AND SEQUENCE OF 31-40.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Hemolysis; Toxin; Outer membrane; Signal.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            HEMOLYSIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         EMBL; M22618; AAA50323.1; -.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           STANDARD;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1356 IPAAVAAGDEAVD 1368
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1386 IQPGVASVEEVIE 1398
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1608
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Hemolysin precursor.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 NCBI_TaxID=615;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           HLYA_SERMA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                       g
                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                 οy
                                                                                                                                                                                                                                                                                                                                                           Db
                                                                                                                                                                                                                                                                                                                                                                                                  οχ
                                                                                                                                                ŏ
```

```
644 DTNLTLVSHKDADVIG--SQVASGGELSVESKTGNI--NVKAAER------QQNIDEQK 692
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               842 NSSSSITGNITIEKAANVTLEA---NNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIK 898
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        899 GNLTISESATFKGKTRDTLNITGNFTNNGTAFINITQGVVKLGNVTNDGDLNITTHAKRN 958
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  452 -----TSSLRTGRWSNSD- 475
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            521 ILHSKGQRGGGVQIDGDITSKGGNLTIYSGGWVDVHKNITLD-----QGFLNITAASVAF 575
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              476 --ESESLKASELRSEGELTLKAGRNVSTQGAKVHAQRDLTIDADNQIQVGVQKTANAKAV 533
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  576 E-----GGNNK----ARDAANA-KIVAQGT-----VTITGEGKDFRANNVSL 612
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   534 RDDKTSWGGIGGDNKNNSNRREISHASELTSGGTLRLNGQOGVTITG-SKARGQKGGEV 592
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           613 NGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHDSHWNVSALNLET 672
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            593 TATHGGLRIDNALSTTVDKIDARTGTAFNIT -- SSSHKADNSYOSS-----TASELKS 643
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    673 GANFTEIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSK 732
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             733 PLPIRFLANITATGGGSVFFDIYANHSG----RGAELKMSEINISNGANFTLNSHVR---G 786
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              693 -----TALTVNG----YAKEAGDKOYRAGLRIEHTRDSEKTTRTENSASSLSGG 737
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   787 DDAFKINKDLTIN-----ATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGGQ 841
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          738 SVKLKAEKDVTFSGSKLVADKGDASVSGNKVSFLAADDKTASN-TEQTKIGGGFYYTGG- 795
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          796 ------DYKLGS-GVEAGYENNKTOAOS--SKAITSGS------DVK 827
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       264 I------INTAQGSGVKLAGSINAGDELKVKAYDIRSESRV--DDASSNKNGGDN 310
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             403 INAQGSGDIAKTGGFVETSGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDE 462
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               463 FPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIG--SNSHL 520
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   186 ---FEQTKDKALAEIVN--HGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  301 LSAKEGEAEIGGVISAQ---NQQAKGGKLM------ITGDKVTLKTGAVIDLS 344
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      311 YONYRGGIYVNDRSSSQTLTRTELKGKNISLVADNHAHLTATDIRGEDITLQ-GGKLTLD 369
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        345 GKEGGETYLGGDERG--EGKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGN 402
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            370 GOOLKOTOGHIDDRWFYSWQYDVTREREOLOGAGSTVAASGSAK--LISTQEDVKLLGAN 427
                                                                                                                                                                                                                                                                                                                                                                      89 LSQLAGQLGANPNLGGREASVILNEVIGRNPSLLHGQQEIFGMAADYVLANPNGISCQSC 148
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              149 GFINTSHSSLVVGNPLVENGVLQGYSTFGNRNTLSLNGTLNAGGVLDLIAPKIDSRGEVI 208
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    209 VODFKOSNGKVTSAAINAISGLNRVARDGTV----QASQQMPTALDSYYLGSMQAGRIN 263
                                                                                                                                                                                                                 62 IPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQ------ 109
                                                                                                                                                                                                                                                                                                                    110 -NEMVQFLQENNN-----SAVFNRVTSNQISQLKG---ILDSNGQVFLINPNGITIGKD 159
Query Match 5.7%; Score 425; DB 1; Length 1608; Best Local Similarity 21.0%; Pred. No. 2.4e-10; Matches 351; Conservative 216; Mismatches 576; Indels 528; Gaps
                                                                                                        2 NKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVTS 61
                                                                                                                                                             3 NNNFRLSAAGKLAAALAIILAASAGAYAAE-------IVAANGANG 41
                                                                                                                                                                                                                                                                42 PGVSTAATGAQVVDIV-----APNGN-GLSHN-----QYQDFNVNQPGAVLNNSREAG 88
                                                                                                                                                                                                                                                                                                                                                                                                                             160 AIINT-------NGFTASTLDISNENIKARNFT------
            Query Match
Best Local S
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qd
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Оb
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Сp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ŏλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏλ
                                                                                                                                                                   g
                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                             οy
                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                      δλ
```

```
959 QRSIIGGDI-----INKKGSLNITDSNNDAEIQIGG----NISQKEGNLTISS 1002
                                                                                                                                               1003 DKINITKQ-----ITIKKGIDGEDSSSDATSNA-NLTIKTKELKLTEDLSISG 1049
                                                                                                                                                                                                                                 1050 FNKAEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSN 1109
                                                                                                                                                                                                                                                                        985 ANRODEQSRDTR-----GSAGVRVYTTT------GSDLTVDAK----GEG 1019
                                                                                                                                                                                                                                                                                                                  1110 GGRESNSDNDTGLT----ITAKNVEVNKDITSLKTVNITASEKVTTTAGSTINATNGKA 1164
                                                                                                                                                                                                                                                                                                                                                                                                  1165 SITTKTGDI-----SCTISGNTVSVSATVDLTTKSGSKIEAKSGEANVTSATGTIG 1215
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1216 GTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEAGSSITSTKGQVDLLA 1275
                                                                                                                                                                                                                                                                                                                                                          1020 GTQRSNSSASQAVTGSIDAANGINVNVKKD-------AIYQGTALNGGRGKT 1064
                                                                                                                                                                                                                                                                                                                                                                                                                                          1065 AVNA-GGDIRLDQASDKQSESRSGFNVKASA----KGGFTADSKNFGA-----GFGG 1111
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1112 GTHNGESSSSTAQVGNISGQGGVELKA-----GRDLFLQG----TDVKSQGDV-- 1155
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1276 QNGSIAGSINAAN-VTLNTTGTLTTVAGSDIKATSGTLVINAKDAKLNGD-----ASGDS 1329
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1156 -----SLSAGNKVALQAAESTQT-------RKESKLSGNIDLGAGSSDS 1192
1330 TEVNAVNASGSGS--VTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKEIEVKYIQ 1387
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1193 KEKTGGNLSAGGAFDIAKVNESATEROG-----ATIASDGKVTLSANGKGDDALHLQ 1244
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1388 PG-VASVEEVIEAKR---VLEKVKDLSDEERETLAKLGVSAVR------FVEPN 1431
                                                                                                                                                                                         EKRSSSSQAVVSSVQAGSIDINAKGEVRDQGTQYQASKGAVNLTADSHR-----SEAA 984
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1245 GAKVSGGSAALEAKNGGILLESAK---NEQHKDNWSLGIKANAKGGQTFNKDAGGKVDPN 1301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               OMPB_RICPR STANDARD; PRT; 1643 AA.
053020; 092CM0;
30-MAY-2000 (Rel. 39, Last sequence update)
15-UN-2002 (Rel. 41, Last annotation update)
15-UN-2002 (Rel. 41, Last annotation update)
0uter membrane protein B precursor (168 kDa surface-layer protein)
(Surface protein antigen) (Cell surface antigen 5) (Sca5) (rOmpB)
(rOmp B) [Contains: 120 kDa surface-exposed protein (Surface protein antigen)) (120 kDa outer membrane protein ompB); 32 kDa beta peptide].
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Carl M., Dobson M.E., Ching W.M., Dasch G.A., "Characterization of the gene encoding the protective paracrystalline-surface-layer protein of Rickettsia provazekii; presence of a truncated identical homolog in Rickettsia typhi.";

Proc. Natl. Acad. Sci. U.S.A. 87:8237-8241(1990).
                                                                                                     876 VGVNIGANVDYSAVTRPVERAVGKAAKLDATGVIND----IGGIGAPNVGLDIGAQGGSS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1302 TGKDTHTLGAGLKVGVEQQDKTTHANTG--ITAGDVTLNSGKDTRLAGARV 1350
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1432 NTITVNT-----GARV 1467
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Bacteria; Proteobacteria; alpha subdivision; Rickettsiales;
Rickettsiaceae; Rickettsieae; Rickettsia.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    SEQUENCE FROM N.A., AND PARTIAL SEQUENCE.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            MEDLINE-91045972; PubMed=2122457;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Moron C.G., Yu X.J., Walker D.H.;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Rickettsia prowazekii.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              NCBI_TaxID=782;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 STRAIN-Breinl;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 OMPB_RICPR
                                                                                                     g
                                                                                                                                               ò
                                                                                                                                                                                     Pp
                                                                                                                                                                                                                              ò
                                                                                                                                                                                                                                                                        P
                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                    à
                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ð
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      á
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
```

```
This SWISS-PROT entry is copyright. It is produced through a collaboration between the Swiss Institute of Bioinformatics and the EMBL outstation - the European Bioinformatics Institute. There are no restrictions on its use by non-profit institutions as long as its content is in no way modified and this statement is not removed. Usage by and for commercial entities requires a license agreement (See http://www.isb-sib.ch/announce/or send an email to license@isb-sib.ch).
                                                                                                                                                                                                                                                                                                                                                         Hackstadt T., Messer R., Cieplak W. Jr., Peacock M.G.;
"Evidence for proteolytic cleavage of the 120-kilodalton outer
membrane protein of rickettsiae: identification of an avirulent mutant
                                                                                                                                                                                                                                                                                                                                                                                                                 -> INSRSSSYHLVS (IN REF. 1).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     45 LALKP-LSAMLLSLGVTSIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWK 103
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             104 QFNIDQ-----NEMVQFLQENNNSAVFNRVTSNQISQLKGILDSNGVFLINPN- 152
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Conservative 218; Mismatches 585; Indels 464; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1 MAQKPNFLKKIISAGLVTASTATIVAGFSGVAM---GAAMQYNRTTNAAATTFDGI---- 53
                                                                                   Andersson S.G.E., Zomorodipour A., Andersson J.O., Sicheritz-Ponten T., Alsmark U.C.M., Podowski R.M., Naeslund A.K., Eriksson A.-S., Winkler H.H., Kurland C.G.; "The genome sequence of Rickettsia prowazekii and the origin of
                                                                                                                                                                                                                                                               of
                                                                                                                                                                                                                                        Ching W.M., Carl M., Dasch G.A., "Mapping of monoclonal antibody binding sites on CNBr fragments the S-layer protein antigens of Rickettsia typhi and Rickettsia prowazekii.";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               InterPro; IPRUUsese, TompA_rompB; 1.
Pfam; PF02708; rompA_rompB; 1.
Antiqen; S-layer; Cell wall; Complete proteome.
120 KDA SURPACE-EXPOSED PROTEIN.
120 KDA SURPACE-EXPOSED PROTEIN.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       SIMILARITY: BELONGS TO THE RICKETTSIAE OMPA/OMPB FAMILY.
"Sequence analysis of ompB of Rickettsia prowazekii.";
Submitted (JUN-1999) to the EMBL/GenBank/DDBJ databases.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            V -> A (IN STRAIN BREINL).
Y -> D (IN STRAIN BREINL).
A -> S (IN STRAIN BREINL).
AA -> VC (IN REF. 1).
TTQEAPLTLGA -> INSRSSSYHLVS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    T -> I (IN REF. 1).
0 -> L (IN REF. 1).
D -> G (IN REF. 2).
T -> S (IN REF. 2).
W; 735FDF392E6346CC CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Pred. No. 4.3e-10;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 DB 1;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Score 419;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      EMBL; M37647; AAA26390.1; ALT_INIT.
                                                           STRAIN=Madrid E;
MEDLINE=99039499; PubMed=9823893;
                                                                                                                                                                                                            STRAIN=Breinl;
MEDLINE=92114896; PubMed=1370573;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 EMBL, AF161079, AAD42234.1; -
EMBL, AJ235273; CAA15140.1; -
InterPro; IPR003858; rOmpA_rOmpB.
                                                                                                                                                                                                                                                                                                                                              MEDLINE=92104668; PubMed=1729180;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1643 AA; 169854 MW;
                                                                                                                                                                                                                                                                                                  .. Immunol. 29:95-105(1992).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              5.7%;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            20.5%;
                                                                                                                                                                 Nature 396:133-140(1998).
                                                                                                                                                                                                                                                                                                                                                                                                      deficient in processing.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1328
1643
257
1010
1450
179
201
212
313
                                           SEQUENCE FROM N.A.
                                                                                                                                                                                             PARTIAL SEQUENCE.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 212
313
1104
                                                                                                                                                   mitochondria.
                                                                                                                                                                                                                                                                                                                              CLEAVAGE SITE.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Matches 327;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    CONFLICT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          VARIANT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Local
ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δ
```

76;

	IGKDAIINTNGFTASTLDISNENIKARNFTFEQTKDKALAEIVNHGLITVGKDGSV 21	INEDTTLGFITNIAQQAKFFNFTVAAGKIL-NITGQGITVQEASNTI 148	NLIGGKVKNEGVISVNGGSISLLAGQKITISDIINPTITYSIAAPENEAVNLGD 265 	GGNINVRAATIR 293	:   : :  :    : VNGGNGTLNITNGFIQVGGTTINIDDCQGLMFNSTPDAANTLNLQVGGNTINFN 265	SGNIVLSAKEGEA 332	GIDGTGKLVLVSKNGAATEFNVTGTLGGNLKGIIEL-NTAAVAGKLISQGGAANAVIGTD 324	VTLKTGAVIDLSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKG 376	NGAGRAAGFIVSVDNGNAAIISGQVYAKNMVIQSANAGGQVTFEHIVDVGLGGTINF-KT 383	AQGSGDIAKTGGEVETSGHDLF 42		EWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELKTTTLTNT 48	STDPNIAVININAIEAEGAGVVELSGI	NITASRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDITSKGG	SEREGNGGSIFKLADGTVINGPVNQNALMNNNALAAGSIQEDGSAIITGDIG 527	ISGGWJDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 600	PFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINI 638	TONNIVVNFDLDITTDKTGV-VDASSLTNNQTLTINGSIGTVVANTKTLAQLNIGSSKTI 636	Η-	LNAGDVAINELVIENNGSVQLNHNTYLITKTINAANQGQIIVAADP 682	LKEGAKVNFKLKPNENMNTSKPLPIRFLANITAT	TIHFATKAANADSIENV /2	SVEFDIYANHSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNF 805  ::	VNLIANNIIIN-DANVOODER KOGGIOIGIVA OOGI VOOGGOINDINELLEGAGII VATATAA	TEGGREGATE          : : :   ITVTLNKQGAYFGV 8	æ		GTAEIN	: LPSGTPLDVLTIKSTVGNGTVDNFNAPIVVVSGLDSMINNGQIIGDKKNIIA 930	-GDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGN 997	GSDNSITVNANTLYSGIRTTKNNQGTVTLSGGMPNNPGTIYGLG 977	
: : GFDQAAGANIPVAPNSVI	-GIT										-		NANGALVSA	TISNY  :	HIAELRLGNGGSI	NLTIY     						LNI	999	SAG					1	7GDLNITTHAKRNQ	1 LSLGSDNSITVNANTLYSGI	
Db 54	Oy 153	Db 99	Oy 212 Db 149	Qy 266	Db 206	Qy 294	Db 266	0у 333	Db 325	Qy 377	ю	4	Db 437	Qy 487	Db 473	Oy 544 Db 528	Qy 601	Db 578	Qy 639	Db 637		Db 683			UY 800		Db 836	Qy 900	Db 876	Oy 947	Db 93.1	

QQ	978	978 LENGSPKLKQVTFTTDYNNLGSIIANNVTINDYVTLTTGGIAGTDF	1023
δy	1056	TAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGG	1111
qq	1024		1078
δλ	1112		1164
qq	1079		1130
Qy	1165	SITTKTGDISGTISGNTVSVSATVDLTTKS-GSKIEAKSGEANVTSATGTIGGTISGN	1221
QQ	1131		1189
δλ	1222		1254
QQ	1190	ANANESGTQAYTLIQGGARFNGTLGAPNFAVTGSNIFVKYELIRDSNQDYVLTRTNDVLN	1249
Ωy	1255		1296
QQ	1250	:    :  : VVTTAVGNSAIANAPGVSQNISRCLESTNTAA	1308
QY	1297		1332
Db	1309	:    :  :	1368
Qy	1333	NAVNASGSGSVTAATSSSVNITGDLNTVNGLNII 1366	
qq	1369	NIAEQDKKGGIAGYKAKTTGVVVGLDTLASDNLM 1402	
Seal	ch co	Search completed: March 24, 2003, 15:22:57	

Job time : 36 secs

		•	
•			
			·
	·		
			•
			•

```
March 24, 2003, 15:22:34 ; Search time 47 Seconds
  (without alignments)
  6475.140 Million cell updates/sec
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          US-10-092-880-4
7407
1 MNKIYRLKFSKRLNALVAVS......CFSSGNGARVCTNVADDGQP 1477
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               671580
GenCore version 5.1.4\_p5\_4578 Copyright (c) 1993 - 2003 Compugen Ltd.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Total number of hits satisfying chosen parameters:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            671580 seqs, 206047115 residues
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries
                                                                                                                                                                                                                        OM protein - protein search, using sw model
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              sp_unclassified:*
sp_rvirus:*
sp_bacteriap:*
sp_archeap:*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Gapop 10.0 , Gapext 0.5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SPTREMBL_21:*
1: Sp_archea:*
2: Sp_archea:*
3: Sp_fungi:*
4: Sp_human:*
5: Sp_invertebrate:*
6: Sp_manmal:*
7: Sp_manmal:*
8: Sp_organelle:*
9: Sp_phage:*
10: Sp_plant:*
11: Sp_varus:*
12: Sp_varus:*
13: Sp_varus:*
13: Sp_varus:*
14: Sp_varus:*
14: Sp_varus:*
15: Sp_varus:*
16: Sp_varus:*
17: Sp_varus:*
17: Sp_varus:*
18: Sp_varus:*
18: Sp_varus:*
19: Sp_varus:*
10: Sp_varus:*
10: Sp_varus:*
11: Sp_varus:*
12: Sp_varus:*
13: Sp_varus:*
14: Sp_varus:*
15: Sp_varus:*
16: Sp_varus:*
17: Sp_varus:*
17: Sp_varus:*
18: Sp_varus:*
1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Minimum DB seq length: 0
Maximum DB seq length: 200000000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          BLOSUM62
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Perfect score:
Sequence:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Scoring table:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Database :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Séarched:
                                                                                                                                                                                                                                                                                                                                           Run on:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Title:
```

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

Description	(48028 haemophilus (48021 haemophilus (9401) haemophilus (95047) yersinia en (82by3 yersinia pe (88442 ralstonia s (91046 pseudomonas (91046 pseudomonas (9218) yersinia pe (9218) yersinia pe (9218) yersinia pe (9218) yersinia pe (9201 haemophilus (9801 ralstonia s (9801 ralstonia s (9801 ralstonia s (9801) ralstonia s (9801) fusobacteri (9816) fusobacteri
SUMMARIES	048028 048028 098N12 093N12 093N7 082BY3 094V06 094V06 082HA1 09F285 09KP07 09KP07 09KP07 09KP07 09KP09
DB	100 100 100 100 100 100 100 100 100 100
% Query Match Length DB	1177 11836 11836 11836 12016 1211 1211 1211 1310 1310 1318 1318 1318
% Query Match	668.98 668.98 668.98 111.23 110.66 110.68 8.10 88.10 88.10 7.75 7.33
Score	7318 4957 4957 900 744 746 736 736 593 593 553 553 548 548
Result No.	11111111111111111111111111111111111111

ء	Q9k0s7 neisseria m Q8zdr Gyersinia pe Q9y23 neisseria m Q9zd91 rickettsia Q9k99 rickettsia Q9id32 neisseria m	09f3x5 pasteurella Q8zia8 yershina pe Q8vmr0 photorhabdu Q8vmy13 ralastonia s	201491 deamphills Q9ahf9 fusobacteri Q9pd50 xylella fas Q8xgz falstonia s Q9jpj4 neisseria m Q8zn57 salmonella	032608 edwardslell 08rds fusobacteri 08xuko ralstonia s 08yk40 anabaena sp P73032 synechocyst 08x2tl escherichia 08yzul anabaena sp 09jy30 neisseria m
	Q9K0S7 Q8ZDR6 Q9JY23 Q9ZD91 Q9KK99	0 1		032608 QBRGZ3 QBRUKO QBYK40 QBYK40 QBXZ11 QBXZ11 QBYZU1
	170			2 16 16 17 16 16 16 16 16 16 16 16 16 16 16 16 16
1881 1270 3501 3552 4152	1975 2535 1995 2340 1604	3293	2324 324 3325 202 203	1594 2462 2751 1487 1749 5291 1152 2514
			৽৽৽৽৽৽	00000000 0000000 00044444
538.5 531.5 530 529 523.5		505.5 504 501.5 495.5	491 489 485 482.5 480.5	480 479 477.5 475.5 474 474 471
17 18 19 20 21	122222	310		86644444 80010846

# ALIGNMENTS

```
20;
1141 VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATGDLTTKSGSKIEA 1200
                                         1261 GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 1320
                                                                                                                              LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 1380
                                                                                                                                               IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQN 1440
                                                                                                                                                                                                SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNGGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Best Local Similarity 67.3%; Pred. No. 2.1e-154;
Matches 1046; Conservative 146; Mismatches 265; Indels 98; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Barenkamp S.J., Leininger E.; "Cloning, expression, and DNA sequence analysis of genes encoding nontypeable Haemophilus influenzae high-molecular-weight surface-exposed proteins related to filamentous hemagglutinin of Bordetella
                           KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTEA
                                                                                                                                                                                                                                                                                                                                                                                                                                  Bacteria; Proteobacteria; gamma subdivision; Pasteurellaceae;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Length 1536;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Infect. Immun. 60:1302-1313(1992).
EMBL: U08876; AAA20527.1; -.
Infertro: IPR000169; SHPOT_acsite.
PROSITE; PS00639; THIOL_PROTEASE_HIS; UNKNOWN.1.
SEQUENCE 1536 AA; 159916 MW; 5CA1C31F9DCF188E CRC64;
                                                                                                                                                                                                                                                                                                                                                                    Last sequence update)
Last annotation update)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    66.9%; Score 4957; DB 2; 67.3%; Pred. No. 2.1e-154;
                                                                                                                                                                                                                                 1536 AA.
                                                                                                                                                                                                                                                                                                                                                         Created)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                STRAIN=12;
MEDLINE=92192797; PubMed=1548058;
                                                                                                                                                                                                                                                                                                                                                     01-NOV-1996 (TrEMBLrel. 01, 01-NOV-1996 (TrEMBLrel. 01, 01-MAR-2002 (TrEMBLrel. 20,
                                                                                                                                                                                                                                                                                                                             PRELIMINARY;
                                                                                                                                                                                                                                                                                                                                                                                                                      Haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          [1]
SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                           NCBI_TaxID=727;
                                                                                                                                                                                                                                                                                                                                                                                                                                                Haemophilus
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              pertussis.";
                                                                                                                                                                                                                                                                                                                                                                                           Adhesin.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Query Match
                                                                                                                                                                                                                                                                                                                                           048031;
                                                                                                                                                                                                                                                                                                                            048031
                                                                                                                                1321
                                                                                                                                                        1321
                                                                                                                                                                                 1381
                                                                                                                                                                                                                                                                                                                                                                                                         HMW1A
                            1201
                                                                                                                                                                                                                                                                                                  RESULT 2
Q48031
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    61
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            121
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       121
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  241
                                                 pp
                                                                              δ
                                                                                                     g
                                                                                                                                                       g
                                                                                                                              ò
                                                                                                                                                                                 ò
                                                                                                                                                                                                        g
                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                       ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Ωp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Ω
```

```
1242 VEVKATESLTTQSNSKIKATTGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1182 VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1242 ATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVA 1301
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1125 TAKNVEVNKDITSLKTVNITA-SEKVTTTAGSTINATNGKASITTKT------ 1170
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -----GDISGTISGNT 1181
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1182 VTLTATEGALAVSNISGNTVTVTANSGALTTLAGSTIKGTESVTTSSQSGDIGGTISGGT 1241
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        943 NSKNLSITTNSSSTYRTIISGNITNKNGDLNITNEGSDTEMQIGGDVSQKEGNLTISSDK 1002
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1005 INITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLT 1064
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1065 IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTI 1124
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      945 NDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDK 1004
                                                                                                                                                                                                                                                                                                                                                                                               94 GTVTITGEGKDFRANNVSLNGTGKGLNIISSVNN---LTHNLSGTINISGNITINQTTRK 650
                                                                                                                                                                                                                                                                                                                                                                                                                                           651 NTS-YWQTSHDSHWNVSALNLETGANFTF-IKYISSNSKGLTTQYRSSAGVNFNGVNGNM 708
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     650 NESGYDKFKGRIYWNLTSLNVSESGEFNLTIDSRGSDSAGTLTQPYNLNGISF---NKDT 706
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     STYNISILGGNVTLGGONSSSSITGNITIEKAANVTLEANNAPNQONIRDRVIKLGSLLV 884
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              885 NGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVT 944
                                                                                                                   421 SGHDLFIKDNAIVDAKEWLLDPDNVSINAETAGRSNTSEDDEY-TGSGNSASTFKRNKE- 478
                                                                                                                                                                                                                                                                                                     540 ----SKGGNLTIYSGGWVDVHKNITLD-QGFLNITA-ASVAFEGGNNKARDAANAKIVAQ 593
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SFNLKEGAKVNFKLKPNENMNTSKPLP-IRFLANITATGGGSVFFDIYANHSG----RGAE 764
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               LKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAIN 824
                                             361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                     SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTG-EASDPKKNSEL 479
                                                                                                                                                                                                                                       480 KTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDIT 539
                                                                                                                                                                                                                                                                       479 KTTLTNTTLESILKKGTFVNITANQRIYVNSSINL-SNGSLTLWSEGRSGGGVEINNDIT 537
241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                 301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1171 -----
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 709
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   765
                                                                                                                                                                       421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ōλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        \dot{o}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                     q
                                                                                                                                                                                                                                     Óλ
                                                                                                                                                                                                                                                                       Db
                                                                                                                                                                                                                                                                                                         οχ
                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                       οy
                                                                                                                                                                                                                                                                                                                                                                                                         QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                             δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                 g
                                                                                                   ò
                                                                                                                                   qq
                                                                                                                                                                     δλ
```

```
23;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             241 ISDIINPTITYSIAAPENEAINLGDIFAKGGNINVRAANIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                  1362 GLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG 1421
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
1302 GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN 1361
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            63.6%; Score 4711; DB 2; Length 1557;
63.3%; Pred. No. 2.3e-146;
ive 155; Mismatches 290; Indels 136; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            MEDIINE-20359363; PubMed-10899870; van Schilfgaarde M., van Ulsen P., Eijk P., Brand M., Stam M., kouame J., Van Alphen L., Dankert J.; "Characterization of adherence of nontypeable Haemophilus influenzae to human epithelial cells.";
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1 MNKIYRLKFSKRLNALVAVSELTRGCDHSTEKGSEKPVRTKVRHLALKPLSAILLSLGMA 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                     1422 VSAVRFVEPNNTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                       1482 VSAVRFIEPNNTITVDTQNEFATRPLSRIVISEGRACFSNSDGATVCVNIADNGR 1536
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Length 1557;
                                                                                                                                                                                                                                                                                                                                                                                                 Bacteria; Proteobacteria; gamma subdivision; Pasteurellaceae;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Van Schilfgaarde M., Eijk P., Van Ulsen P.;
Submitted (AUG-1999) to the EMBL/GenBank/DDBJ databases.
EMBL, AF180944; AAD56660.1; -
InterPro; IPR000169; SHProt_acsite.
PROSITE: PS00639; THIOL_PROTEASE_HIS; UNKNOWN 1.
SEQUENCE 1557 AA, 160461 MN; 62524D384398CB37 CRC64;
                                                                                                                                                                                                                                                                                              01.MAY-2000 (TrEMBLrel. 13, Created)
01.MAY-2000 (TrEMBLrel. 13, Last sequence update)
01.HAR-2002 (TrEMBLrel. 20, Last annotation update)
                                                                                                                                                                                                                                                              PRT; 1557 AA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Infect. Immun. 68:4658-4665(2000).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ilarity 63.3%; Pr
Conservative 155;
                                                                                                                                                                                                                                                                PRELIMINARY;
                                                                                                                                                                                                                                                                                                                                                                                   Haemophilus influenzae.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                   NCBI_TaxID=727;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             STRAIN-A950006
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Matches 1003;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Query Match
                                                                                                                                                                                                                                                                Q9RNI2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    301
                                                                                                                                                                                                                             RESULT 3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    δy
                                                                                                                                                                                                                                                                                QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δy
                                    g
                                                                                                      qq
                                                                                                                                           δλ
                                                                      ŏ
```

```
GNVTNDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTI 1000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1061 RDLTIGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSD-ND 1119
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
          421 SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKK-NSEL 479
                                                                                      480 KITLINITISNYLKNAWIMNITASRKLIVNSSINIGSNSHLILHSKGQRGGGVQIDGDIT 539
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SSDKINITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDG 1060
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ...--GDISGT 1176
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SKSGGVTLTATGDTLAVGNISGNTVSVTANSGTLTTKADSTIKGTGSVTTLSQSGDIGGT 1232
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ISGNTVSVSATVD-LTTKSGSKIEAKSGEANVT-----SATG 1212
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1213 TIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEAGSSITSTKGQVD 1272
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          420 SGHYLSIGNDAAVEAKEWLLDPDNVTI----SNGNDDQSQLKDDRGDSPNKILADN 471
                                                                                                      S-KGGNLTIYSGGWVDVHKNITLDQGFLNITA-ASVAFE-GGNNKARDAANAKIVAQGTV 596
                                                                                                                                               653
                                                                                                                                                                                                                           654 YWQTSHDSHWNVSALNLETGANF--TFIK-----YISSNSKGLTTQYRSSAGVNFNGV 704
                                                                                                                                                                                                                                          760
                                                                                                                                                                                                                                                                                                                                                              821 NAINSTYNISILGGNVTLGGQNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLG 880
                                                                                                                                                                                                                                                                                                                                                                                                         881 SLLVNGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKL 940
                                                                                                                                                                              597 TITGEGKDFRANNVSLNGTGKGLNIIS---SVNNLTHNLSGTINISGNITINQTTRKNTS
                                                                                                                                                                                             RGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYAR
                                                                                                                                                                                                                                                                                                                                                                            705 NGNMSFNLKEGAKVNFKLK-PNENMNTSKPLPIRFLANITATGGGSV---FFDIYANHSG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1120 TGLTITAKNVEVNKDITSLKTVNITASE-KVTTTAGSTINATNGKASITTKT-----
                                                                                                                                                                                                                                                                                                                     191
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1001
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1053
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1171
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1173
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1177
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1233
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      993
 ò
                      qq
                                           ò
                                                                 g
                                                                                       ò
                                                                                                            q
                                                                                                                                   ð
                                                                                                                                                        q
                                                                                                                                                                               ò
                                                                                                                                                                                                    g
                                                                                                                                                                                                                           à
                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                      g
                                                                                                                                                                                                                                                                                                                   à
                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                    쉽
                                                                                                                                                                                                                                                                                                                                                                                                        ò
                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                     δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         à
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              q
```

```
81;
1333 NAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKEIEVKYIQPGVAS 1392
                                          1393 VEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNTITVNTQNEFTTRPSSQVII 1452
                                                                                                                                                                         Query Match 12.2%; Score 900; DB 2; Length 2065; Best Local Similarity 25.0%; Pred. No. 7.8e-22; Matches 420; Conservative 258; Mismatches 623; Indels 378; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     49 PLSAMLLSLGVTSIPQSVLAS---GLQGMDVVHGTATMQVDGNK-TIIRNSVDAIINWKQ 104
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   164
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      222
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  169 GGLIASTKSMSNQDFISGCYTL--TSQKQEGKLVNQANLRTTAGGYIALIGQQVDNQPSG 226
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     223 VISVNGGSISLLAGQKITIS----DIINPTITYSIAAPENEAVNL-----GDIFAKGGNI 273
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              227 VINTPQGKVALASGSRVILNLDRGNLLGVQV-----QGEQVNTLLQNGGLIRADEGVI 279
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        274 NVRA-----ATIRNQGKLSADSVSKDKSGNIVLS-AKEGEAEIGGVISAQNQQAKGG 324
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   325 KLMITGDKVTLKTGAVIDLSGKE-GGETYLGGDERGEGKNGIQLAKKTSLEKGSTINVSG 383
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     339 NVILIGENIHLVAASKIDARGDEGGGKVLVGGDWQGKNKL-IKNARSVVMDKGANIDVSS 397
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          384 KEK--GGFAIVWGD-IALIDGNINAQGSGDIAKTGGFVETSGHDLF----IKDNAIV-D 434
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      2 NKIYRLKFSKRLNALVAVSELARGC------DHSTEKGSEKPARMKVRHLALK 48
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       54
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                :|:|:| | :|| |:|| |:|| | |:|| | |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: || |: |
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        105 FNIDQNEMVQFLQENNNSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               165 NGFTASTLDISNENIKARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNE--G
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Nelson K.M., Young G.M., Miller V.L., Identification of a Locus Involved in Systemic Dissemination of Yersinia enterocollitica."; Infect. Immun. 69:6201-6208(2001). Infect. Immun. 69:6201-6208(2001). Interpro: IPRO01950; TIF_SUII. PROSITE: PSOII18; SUII.1: UNKNOWN_1. SEQUENCE 2065 AA: 210024 MW; A306D0763682D176 CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Bacteria; Proteobacteria; gamma subdivision; Enterobacteriaceae;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Last sequence update)
Last annotation update)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PRT; 2065 AA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Created)
                                                                                                                                                                                                                                                                                                            1453 SEGKACFSSGNGARVCTNVADDGQ 1476
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SEQUENCE FROM N.A. MEDLINE-21437624; PubMed=11553561;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               01-DEC-2001 (TrEMBLrel. 19,
01-DEC-2001 (TrEMBLrel. 19,
01-MAR-2002 (TrEMBLrel. 20,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   PRELIMINARY;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Yersinia enterocolitica.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        NCBI_TaxID=630;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Yersinia,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     RSCA
                                                                                                                                                                                                                                                                                                                                                                                                                                            RESULT 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               093DC
                                                               qq
                                                                                                                                      ŏ
                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                         ò
                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        a
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ď
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ò
```

```
1340 KGSSVAGSGVAISGMVNNSSGPVTIEGSSTDGSGVHLFSAEHQINRINVTGSSIQAEGLR 1399
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                985 NYTYGRDISIIANNHGNMTGAGIGVDYVNFEAKNG--NFTANNN------GSKSIGIAN 1035
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               998 LTISSDKINITKQITIKKGI----DGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAE 1054
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1055 ITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKD---SKISADGHNVTLNSKVKTSSSNGG 1111
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1096 LAA-----NISLKGSNSKGS 1136
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1112 RESNSDN--DTGLTITAKNVEVNKDITSLKTVNITASEKVTTTAGSTINATNGKASITTK 1169
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1137 NPRSSVNLANVSLTSVGKNIDIN-----SSS 1162
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1170 TGDISGTISGNTVSVSATVDLTTKSGSKIEAKSGEANVTSATG-----TIGGTISGNTV 1223
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1163 VGD--GDIYFNNVDLNAALGNVTVYGEALSALSTATNSVLSLGGNNSIKALNGLLIGKAI 1220
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1224 NVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEAGSSI-----TSTKGQVDLLAQ 1276
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1221 NTSQGAGTLFRANGS-LSVAGNIAIQGETGGTGAIRNGIAFYGANTLNIAKDSQLSLLGE 1279
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1277 N-----GSIAGSINAANVTLNTTGTL-----TTVAGSDIKATSGTLVINAK-DAKL 1321
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1280 NTGSQITAGGNGISYLSPKTLTINNNGSLTMEGRSTSGAGINFPIGNNTVVLNGEGDSLI 1339
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1322 NGDA-SGDSTEVNAVNASGSGSVTAATSSS------VNITGDLNTVNGLN 1364
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 822 IKLQGVTTNSTTVGADAIKISGNSSSVQVNMAAGGNISMVAVNKGTEVG---STISADYT 878
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            942 NVTNDGDLNITTHAKRNQRSI-IGGDIIN---KKGSLNITDSNNDAEIQIGGNISQKEGN 997
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              722 LKPNENMNTSKPLPIRFL---ANITATGGGSVFFDIYANHSGRGAELKMS---EINISNG 775
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                776 ANF---TLNSHVRGDDAFKI---NKDLTIN-ATNSNFSLRQTKDDFYDGYARNAINSTY- 827
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                828 NISILGGNVTLGGONSSSSITGNITIEKAANVTLEANNAPNOONIRDRVIKLGSLLVNGS 887
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              879 NIKAQGGDFNLNISGVKGSPFSNVNI-SADNIILNGNISDN-----DAVV-----MINTF 927
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            888 LSLTGENADIKGNLTIS--ESATFKG----KTRDTLNITGNFTNNGTAEINITQGVVKLG 941
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 928 LAAKG---DIKANLSSPNYKALYFKGNGGMSAGONLSVAVNTSGASVEAVTITGIASNRM 984
                                                                                                                                  638 ISG-NITINQ-----TTRKNTSYWQTSHD-SHWNVSALN--LETGANFTFI 679
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 680 KYISSNSKGLTTQYRSSAGVNF-NG----VNGNMSFNLK-------EGAKVNFK 721
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               770 ---NVNVEINTKGVDGFLLRDSHITATAG-----NISANATTTHKGLWISGDTDLNASKN 821
435 AKEWLLDFDNVSI----NAEDPLFNNTGINDEFPTG---TGEASDPKKNSELKTTLTNTTI 488
                                           457 TGRWLLDPAEVNIVGSGAESGVSVQIG---DIPAGYVKNAQVFTPMAN---VTQILNTSI 510
                                                                                                  489 SNYLKNAWTMNITASR-----KLTVNSSIN--IGSNSHLILHSKGQRGGGVQIDGD 537
                                                                                                                                                                                               538 ITSKGGNLTIYSGGWVDVHKNITLDQG-----FLNITAASVAFEGG-----NNKA 582
                                                                                                                                                                                                                                                561 IVSNGHNITATTG-----KLNLNLLSGDSIVDSIITLNNSDVLLNGGDLLMKHANENNAA 615
                                                                                                                                                                                                                                                                                              583 RDAANAKIVAQGTVTITGEGKDFRANNVSLNG-TGK----GLNIISSVNNLTHNLSGTIN 637
                                                                                                                                                                                                                                                                                                                                                                                                                                               659 ISGESSNANQOGWRGIDISGDSVFAGKGNMSFTMTSNSRSSWMGTFTNATIAGDKNITF- 717
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  οqα
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       d
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ŏλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Qy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                               Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ΩD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   οy
                                                                                                                                                      qq
                                                                                                                                                                                                        δŏ
                                                                                                                                                                                                                                                                                                       οy
                                                                                                                                                                                                                                                                                                                                                   Ω
```

```
395 DIALIDGNINAGG---SGDIAKTGGFVETSGH---DLFIKDNAIV---DAKEWLLDFDNV 445
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            STRAIN-CO-92 / BIOVAR ORIENTALIS;
MEDLINE-21470413; PubMed=11566360;
MEDLINE-21470413; PubMed=11566360;
MEDLINE-21470413; PubMed=11566360;
Parkhill J., Wren B.W., Thomson N.R., Titball R.W., Holden M.T.G., Prentice M.B., Sebaihia M., James K.D., Churcher C., Mungall K.L., Bakets S., Basham D., Bentley S.D., Brooks K.D., Cerdenor Tarraga A.M., Chillingworth T., Cronin A., Davies R.M., Davis P., Dougan G., Chillingworth T., Cronin A., Davies R.M., Davis P., Dougan G., Simmonds M., Skelton J., Stevens K., Whitehead S., Barrell B.G., Simmonds M., Skelton J. Stevens K., Whitehead S., Barrell B.G., Nature 413:523-527(2001).

BABL, A.4414156; CAC92482.1;
Hypothetical protein; Complete proteome.

SEQUENCE 1910 AA; 195076 MW; CGE5127A098E4045 CRC64;
1365 IISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSA 1424
                               1400 ISGNATITDTALSGKSINGSGIK-----VDSLLGSGVITHVVLDNAALNGSSTHGIGVEI 1454
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    11.8%; Score 876; DB 16; Length 1910;
ilarity 25.5%; Pred. No. 4.3e-21;
Conservative 235; Mismatches 665; Indels 332; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         62 IPQSVLASGLQGMD--VVHGTATMQVDGNKTIIRNSVDAI-INWKQFNIDQNEMVQFLQE 118
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       63 FPLLVLAHPVLPVNGHVVIGQGMLDQQSSTLTVTQQTDKLAINWDSFDIAHGHSVIYAQP 122
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       119 NNNSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNEN 178
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        123 GSQSIALNOVOGQSASQIYGRLQANGOVFLLNPRGILFGKEAQVNVGGLVASTKYMSNPE 182
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   179 IKARNETFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNE--GVISVNGGSISLLAG 236
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   183 FLSGDYRL--IGGESEGNIINQANLRSAPGGYIALVGNRIDNQRSGSITTPQGNTVLAVG 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       237 QKITIS----DIINPTITYSIAAPENEAV-----NLGDIFAKGGNINVRA-----AT 279
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               241 HSVTENLEDHGNELGVQI------QGETVAALIQNGGLIQADGGVIQLTAKGKDMEMDTV 293
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        280 IRNOGKLSADSVSKDKSGNIVL-SAKEGEAEIGGVISAQNOQAKGGKLMITGDKVTLKTG 338
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    294 IDNTGILQAKGLSA-KNGAIYLDGGGEGVVSQMGTIDVNNQQGRGGRAVVEGKRIYLNKN 352
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      339 AVIDLSGKEGGETYL-GGDERGEGKNGIQLAKKTSLEKGSTINVSGKEK--GGFAIVWG- 394
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   353 SNIKAKGTAGGGTVLVGGGWQGK-DNQIRNATAVVMDKGSDIDVSASRNGPGGSAVLMSE 411
                                                                                                                                1425 VREVEP-----NNT-----ITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTN 1470
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      3 SKLYKLIFCRRLGCLIAVGEFTRSYGRAFSSKGGQAGNNQRRAVGILSRLAMMTGLALGI 62
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2 NKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVTS 61
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Bacteria; Proteobacteria; gamma subdivision; Enterobacteriaceae;
                                                                                                                                                                                                                                                                                                                          01.MAR-2002 (TrEMBLrel. 20, Created)
01.MAR-2002 (TrEMBLrel. 20, Last sequence update)
01.HAR-2002 (TrEMBLrel. 20, Last annotation update)
                                                                                                                                                                                                                                                                         PRT; 1910 AA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Similarity
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                 Putative adhesin.
HMWA OR YPO3247.
                                                                                                                                                                                                                                                                                                                                                                                                                                                    Yersinia pestis
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      NCBI_TaxID=632;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                421;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Yersinia.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Query Match
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Matches
                                                                                                                                                                                                                              RESULT 5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ٠,٥
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                   οp
                                                                                                         ŏ
```

Ω	412 D	DYTGFHGNIRARGGPQSGDGGQVETSSQRNLQAFGQVDASAVRGSAGYWLLDPAEV 467
Qy	446 S	<u> </u>
Op	468 T	TIVSSGAESGVMTKVGNIPAEF-FSSAHIFIPTANITQILNSSINTQLNSGTNVTIT 523
οy	502 A	ASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITSKGGNLTIYSGGWVDVHKN 558
q	524 T	SNSZLTGCQMCNITVQADITKTAGADATLTLQADGNIVVNNN 566
Oy Op	559 II 	ITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGT 615 
ŏ		TOTAL STANDARD COMPONENT CONTRACT IN THE TANDARD CONTRACT IN THE
qq		SRYDVGNFTLDGNTALASQVGVNISNAANISV
Qy	673 GF	GVNGNMSFNLKEGAKVNFKLKPNE
Ωp	653 -	-
δλ		NAMTSKPLPIRFLANITATGGGSVFFDIYANHGGRG 762
qq		NATITSDKNIIFQGTGSSSGGVDFVNSRILSKSGRVLFDINGNIVVKNVYGLRVNNSQLS 764
ò		AELKMSEINISNGANFTL-NSHVRGDDAFKINKDLTINA-TNSNFSLRQ 809
Q C		KDVKFAVNVTGVDGFLLRDSHVTATSGDINANANTINKGIWISGKTNLNASGNVNLHGV 824
δ δ	0 1	TKDDFYDGYARNAINSTYNISILGGNVTLGGQNSSSSITG
gn	n	INSAYAGADAIKISGNSSSNNVNITAGGHISLIAVNGGKEIGSTVSVDYANIIAKNG 882
ò d	850	NITLEKAANVTLEANNAPNQONIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
3 3		2 1
6 3	935 LT	LIL SESATEKGKTRDILNITGRETNNTABEINITGGVVKLGNVTNDGDLNITTHA 955        :   :   :         :
δy	956 KR	OC TOWNINGS THE SOKE GIVE TO SOME TO SOME SOME SOME SOME SOME SOME SOME SOM
qq	4	
δ	1012 TI	OGEDSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLT-IGNS 106
qq	1043 TG	TGTGGIVLDNTNILTTVGDINTIVTNSSGKGIMIKSNSTLNSNKDITLVGVS 1094
Οy	1069 ND	NDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKISSSNGGRESNSDNDTGLT 1123
QQ	1095 AG	AGQNEGVIIQGSSDASRNNISAQG-NITLIGKMGNGSGQHSLINLGNVSLT 1144
οy	1124 IT.	AKNVEVNKDITSLKTVNITASEKVTTTAGSTINATNCKASITTKTGDISGTISGNTVS 1183
qa .	1145 SS	SGRNIDINGSSAGTGDVYFTNVELNATAGNVSIYAETKTALS 1187
δλ	1184 VS	VSATVDLITKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINAT 1243
Dp	1188 TS	124
οy	1244 EG	AANVT
QQ	1243 EG	129
ογ	1295 GTI	LTTVAGSDIKATSGTLVINAK-DAKLNGDA-SGDSTEVNAVNASGSGSVTAA 1346
Op	1300 GSI	GSLKMEGRSTSGTGINFPSSNNTLVFNGDGDTLIKGSSVAGTGAAISGVVNNSTGPMILE 1359
οy	1347 TSSS	SSVNITGDLNTVNGLNIISKDGRNTVRLRGKEIEVKYIQ 1387
DP	1360 GIS	GISTDGAGVHLFSAEHRIDRINVTGSSTHAEGLRISGNAAIVDTTLTGKSINGSGVKIDS 1419

```
61;
1388 - PGVASVEEVIEAKRVLEK--VKDLSDEERETLAKLGVSAVRFVEPNNTIT-----VN 1437
                                              Salanoubar M., Genin S., Artiguenave F., Gouzy J., Mangenot S.,
Ariat M., Billault A., Brottier P., Camus J.C., Cattolico L.,
Chandler M., Choisne N., Claudel-Renard C., Cunnac S., Demange N.,
A chandler M., Moisan A., Robert C., Saurin W., Schlex T.,
Siguier P., Thebault P., Whalen M., Wincker P., Levy M.,
Weissenbach J., Boucher C.A.;
R weissenbach J., Boucher C.A.;
R Meissenbach J., Boucher C.A.;
R Nature 415:497-502(2002).
R Interpro: IPR002064; CaD18595.1; -.
R Interpro: IPR002064; DNA_POL_B.
R REBL; AL646084; CAD18595.1; -.
R Interpro: IPR002064; DNA_POL_B.
R ROSITE; PS00116; DNA_POLYMERASE_B; UNKNOWN_1.
R PROSITE; PS00116; DNA_POLYMERASE_B; UNKNOWN_1.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              75 -DVVHGTATMQVDG-NKTIIRNSVDAIINWKQFNIDQNEMVQFLQENNNSAVFNRVTSNQ 132
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         133 ISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIKARNFTFEQTKDK 192
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               193 ALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKITISDIINPTITYS 252
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   289 DSVS--KDKSGNIVLSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGK 346
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      42 VRH-----LALKPLSAMLLSLGVTS---IPQSVLASGLQGM--------74
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ------NVRAATI-RNQG--KLSA 288
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           238 ISAGAARTLVNNGGMIVADGGRVVLIARGLDSLSESVVNTTGVVRARTVGNNQGTIELIG 297
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         298 DPVAGLTQVSGQIDASAPDG----GG-----NGGSVKVLGTKVGVFDGAQIDVSGM 344
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    347 EGGETYL-GGDERGEGKNGIQLAKKTSLEKGSTINVSG--KEKGGFAIVWG-DIALIDGN 402
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Ouery Match
10.6%; Score 785; DB 16; Length 1371;
Best Local Similarity 24.2%; Pred. No. 2.86-18;
Matches 365; Conservative 196; Mismatches 533; Indels 414;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Plasmid megaplasmid.
Bacteria; Proteobacteria; beta subdivision; Ralstonia group;
                                                                                                                                                                                                                                                                                                                                                                                                                                               Created)
Last sequence update)
Last annotation update)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Ralstonia solanacearum (Pseudomonas solanacearum).
                                                                                                                                     1438 TQNEFTTRPSSQVIISEGKACFSSGNGARVCTN 1470
                                                                                                                                                                                   : | | : | | : | | 1507
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Putative hemagglutinin-related protein. RSP1444 OR RS03099.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       STRAIN-GMI1000;
MEDLINE-21681879; Pubmed-11823852;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 253 IAAPENEAV -- NLGDIFAKGGNI-----
                                                                                                                                                                                                                                                                                                                                                                                                                                        01-MAR-2002 (TrEMBLrel. 20, 01-MAR-2002 (TrEMBLrel. 20, 01-JUN-2002 (TrEMBLrel. 21,
                                                                                                                                                                                                                                                                                                                                                                              PRELIMINARY;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NCBI_TaxID=305;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Ralstonia.
                                                                                                                                                                                                                                                                                                                                                                              Q8XQ42
Q8XQ42;
                                                                                                                                                                                                                                                                                                          RESULT 6
Q8XQ42
                                                                    g
                                                                                                                                        δ
                                                                                                                                                                                                                                                                                                                                                                                                               ACCONTRACTOR SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUTION OF SOLUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   q
```

ò

1363 LNIISKDG 1370

ò

```
963 GITOSGAVSAAGTATL---NGGNAAITLTNDGNA-----FNAL--AVIGAAGVNV-- 1007
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1100 NSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKTVNITASEKVTTTAGSTINA 1159
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1160 TN-----GKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEAKSGEANVTSATGTI 1214
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1215 GGTISGNTVNVTANA--GDLT----VGNGAEINATEGAATLTATGNTLTTEAGSSITSTK 1268
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | : : | | | : : | : | : | : | : | | | : : | | | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1151 GGASDPALAYTIVGQVNGDSATQILSGSLARAAGQNAGRYAISQGTLADQLGYQTVLDVG 1210
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1305 --IKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNG 1362
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1211 HAFSITPAPLLITA----NGASRTAGQDNPAFSATFAGFVGGQTAQTADLRGTLRLLTS 1265
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1040 KLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTL 1099
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1037 GNWSISGGDLTLSAGAGNTRGTASGGNVDSQAT--LAVDAGRTITVYSGAVGSTVLGGTL 1094
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             980 NNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGEDSSSDATSNANLTIKTKEL 1039
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  806 WGSGSGAVTMSAPASSSITISARSLDSVSGYSGFYIGGGSATLTFATAAPVSIAAESLVG 865
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          866 ARKAFWNKGGLTVPGNLRIVTTGGAIADDTTHG--GYFHVTGSTSIDSSGAGNTVSLTNS 923
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          924 GN----TFAGALSLNAGDTTLAS-----STSLTL-----DSSTVNGALNLTAP---- 962
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               766 GNASSTSNGNAAVKLDGKVNLTATAGP-----INIAGSNAGGDGV 805
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  941 ------GNVTNDGDLNI-----TTHAKRNQRSIIGGDIINKKG---SLNITDS 979
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 801 INSNFSLRQTKDDFYDGYARNAINSTY-----NI-----SILGGNVTLGGQNS-- 843
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   723 T------ASNPVSSTYRNQLSTVNIAGTGSNAASLTGGTVTITGTNSVV 765
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            844 ---SSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGENADIKG- 899
                                                                           456 NTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITAS--RKLTVNSSIN 513
                                                                                                                                                                                                                                                                                             456 ------GTQTGGA------FSGNVWTPSASGSLVNTSSIQSLLN 487
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  488 SGGNVTITTTGAGTQEGNIAINGSISKTAGGNASLTLIADGRITTNASSGTHRTITSTSG 547
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           565 FLNITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLNIISS 624
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              548 TLDVSM------TARATTSAASTSGINLRYVDINANGGNISATASGAQSGTA 593
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 625 VNNLTHULSGTINISGNITINQTTRKNTSYWQTSHDSHWNVSALNLETGANFTFIKYISS 684
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        594 AALSLQNSSWSTTGAGNISLSGTLPDNGN----SQGVFLNANTLTTASGS-----ITVSG 644
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           685 NSKGLTTQYRSSAGVNFNGV----NGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFLA 740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              741 NITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINA 800
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         678 -LRSTGGGA----IALTGTATGATATWA-----GSGVTLSAL----DSLSTSGAVTISG 722
403 INAQGSGDIAKTGGFVETSGHDLFIKDNAIVDAKE------WLLDFDNVSINAEDPLFN 455
                                                                                                                                                                                                                                                                                                                                                                                                514 IGSNSHLILHSKGQRGGGVQIDGDIT-SKGGN--LTIYSGGWV-----DVHKNITLDQG 564
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        900 -----NLTISESATFKGKTRDTLN-ITGNFTNNGTAEINI-TQGVVKL----
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1269 GOVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSD------
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δý
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ρp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ŏλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  οχ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ò
                                                                                                                                                                                                                                                                                                                                                                                                      δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             qq
```

```
239 ALVSNGGAİQADGGSVLITAEQASRVVDNAVNLSGVILARGTEVREGSVALVSKGGDIQI 298
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 299 AGKIDVSGPK-NGGDVLVSGQQVALASTASIDARGTAQGGSVRIGGDFQGRGE--LPRAK 355
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              370 KTSLEKGSTINVS--GKEKGGFAIVWGD-IALIDGNINAQGSGDIAKTGGFVETSGH-DL 425
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           426 FIKDNAIV-----DAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSE 478
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               479 LKT-TLTNTTISNYLKNAWTMNITASRKLTVNSSI----NIGSNSH-LILHSKGQRGGGVQ 533
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     469 VVTGALAGGKVT-----LSASDRLSVEAPLITSNLGGASRGLELIATGP-AGAVD 517
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        534 IDGDITSK-----GGNLTIYSGGWVDVHKNITLDQGFL---NITAASVAFEGGNNKA 582
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              206 GKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKITI----SDIINPTITYSIAAPENEA- 260
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   261 ---VNLGDIFAKGGNINVRA----ATIRNQGKLSADSVSKD---KSGNIVLSAKEGEAEI 310
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               311 GGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSG-KEGGETYLGGDERGEGKNGIQLAK 369
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             356 NATLAKGASIDVSATGKGNGGLAVVWSDGNTRMDGRILARG-GAQGGNGGLVETSGKVNL 414
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               10.1%; Score 744.5; DB 16; Length 2154; ilarity 23.9%; Pred. No. 9.7e-17; Conservative 231; Mismatches 585; Indels 437; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              87 GNKTIIRNSVD-AIINWKQFNIDQNEMVQFLQENNNSAVFNRVTSNQISQLKGILDSNGQ 145
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    146 VFLINPNGITIGKDAIINTNGFTASTLDISNENIKARNFTFEQTKDKALAEIVNHGLITV 205
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    179 AEKGLAAFVAPSVANNGVINARLGTVAMAAGNAATIDLYGDGLVSIAVTDPVTRKPQDAQ 238
                                                                                                                                                                                              Bacteria, Proteobacteria, gamma subdivision, Pseudomonadaceae,
                                                                                                                                                                                                                                                                                                                                                                                                                          opportunistic pathogen.";
Nature 406:959-964(2000).
EMBL; AE004876; AEG08013.1; -.
Hypothetical protein; Complete proteome.
SEQUENCE 2154 AA; 219755 MW; 4BBABCE6696BAOCE CRC64;
                                                                                                     01-MAR-2001 (TrEMBLrel. 16, Created)
01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
01-007-2001 (TrEMBLrel. 18, Last annotation update)
                                                                        PRT; 2154 AA.
                                                                                                                                                     Hypothetical protein PA4625.
                                                                                                                                                                                       Pseudomonas aeruginosa
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Similarity
1266 ADAGSPAG 1273
                                                                                                                                                                                                                                 NCBI_TaxID=287;
                                                                                                                                                                                                                    Pseudomonas.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  394;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Query Match
                                                                           99VH60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Ωp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    QΥ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 δy
                                                                                                                        οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       QΥ
```

518 ISAPILFRNG 583 RDAAN	ISAPILFRNGSLAIRAGGNINFLSGGTPQTSGIVDLGSGTLWMQTSTAGKISQQAGTA 575  RDAANAKIVAQGTVTITGEGKDFRANNVSLNGT 615
AANLAGRA	63
:    AQNIVSSV	:
OTSHDSHWNV  :   :   PTNDSSDYLV	QTSHDSHWNVSALNLE-TGANETFIKYISSNSKGLTTOYRSSAGV-NFN 702  :  :  :            PTNDSSDYLVTNLRYQVNGSNVTATPNGGAPSGFTVAAGNGSVTTWTGNWGTSWGVKGFG 750
GVNG      GVIGVTDELO	
NTSKP	-NTSKPLPIRELANITATGGSVFFDIYANHSGRG
: TAGDILSRO	FRVZGDVNPTLTATMSGINAIDAYVNSQFNDLYQATASTT
INISNGANF     :  TQASNVGQY	EINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAI 823 
STYNIS    :  -TYQVSGLK	
ANNAPNOON- 	3SLS-LTGENADIK 89
GNLTISESATI         GINQGGLC	953
HAKRNQRSIIGGDIIN   ::  QVSGLKNGDTAGAVLNGGS	HAKRNQRSIIGGDIIN
TLTISSDKIN]    ::: :  LTITKALLNV	NRA
-EDLSISGFN  :::    GENVGYYGIN	NDGNSQAEAKTVTFNNVKDSKI                     NLTITKALLNVIADAKTKVYGDADPSLTYOV
SADGHNV :   SGLKNGDTAGA	114
SEKVTTTAGS :::: TKALLNVIAD	SGNTVSV       CTGGLNRAAGENVGVYGINO
SATVDLT 	
ANAGDLTVGN       : LNGGGLVRVS	
DPSLTYQVS	DADPSLIYQVSGLKNGDIAGAVLN-GGSLSRVAGENVGVYGINGGDLAIN 1537
ASGDSTEVN   :	GDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLN 1364

ò g á

```
SEQUENCE FROM N.A.

STRAIN-ATCC 15692 / PAO1;

STRAIN-ATCC 15692 / PAO1;

MEDLINE-2043737; Pubmed-10984043;

Stover C.K., Pham X.-Q.T., Erwin A.L., Mizoguchi S.D., Warrener P., Hickey M.J., Brinkman F.S.L., Hufnagle W.O., Kowalik D.J., Lagrou M., Garber R.L., Goltry L., Tolentino E., Westbrock-Wadman S., Yuan Y., Brody L.L., Coulter S.N., Folger K.R., Kas A., Larbig K., Lim R.M., Smith K.A., Spencer D.H., Wong G.K.-S., Wu Z., Paulsen I.T., Raizer J., Saler M.H., Hancock R.E.W., Lory S., Olson M.V.;

"Complete genome sequence of Pseudomonas aeruginosa PAO1, an
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 61 SIPQSVLASGLOGMDVVHGTATMQ--VDGNKTII-RNSVDAIINWKQFNIDQNEMVQFLQ 117
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          118 ENNNSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNE 177
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Query Match
8.6%; Score 636.5; DB 16; Length 1417;
Best Local Similarity 21.9%; Pred. No. 2.1e-13;
Matches 352; Conservative 238; Mismatches 523; Indels 495; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              48 QAPAFALPS---GATVVSGDAGFQTSTDGRHMVIDQQSHKLITNWNEFSVRADERVSFHQ 104
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  178 NIKARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQ 237
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           238 KITISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRA-----ATIRNQGKLSADSV 291
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   292 SKDKSGNIVLSAKEGEAEIGGVISAQN-----QQAKGGKLMITGDKVTLKTGAVIDLS 344
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            256 ----GGQVLMSARSADSLLKTVVNNQGTLEARTLRSAEGRIVLDGGEQGTVRVAGKQDAS 311
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                345 GKEGGETYLGGDERGEGKNGIQLAK----KTSLEKGSTINVSGKEKGGFAIVWGDIALID 400
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         401 -GNINAQGSGDIAKTGGFVETSGHDLFIKDNALVDAKEWLLDFDNVSINAEDPLFNNTGI 459
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1 MNKSYTLVWNQ-----ATGCWNVASEGTRRSK-SGRGKALVVAGASLLGL-FC 47
                                                                                                                                                                                                                                                               Pseudomonas aeruginosa.
Bacteria; Proteobacteria; gamma subdivision; Pseudomonadaceae;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   InterPro; IPR003880; Ppantne_attach.
PROSITE; PS00012; PHOSPHOPANTETHEINE; UNKNOWN_1.
Hypothetical protein; Complete proteome.
SEQUENCE 1417 AA; 139958 MW; 212C916D5A55C39D CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       <del>-:</del>
                                                                                                                                                                01-MAR-2001 (TrEMBLrel. 16, Created)
01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
01-MAR-2002 (TrEMBLrel. 20, Last annotation update)
Hypothetical protein PA4541.
                                                                                                                                    PRT; 1417 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       <del>..</del>
                     1365 -- IISKDGRNTVRLRGKEIEVKYIQPG 1389
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ..
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Opportunistic pathogen.";
Nature 406:959-964(2000).
EMBL; AE004867; AAG07929.1; -.
HSSP; P22629; 1SWC.
                                                                                                                                  PRELIMINARY;
                                                                                                                                                                                                                                                                                                                       NCBI_TaxID=287;
                                                                                                                                                                                                                                                                                                       Pseudomonas
                                                                                                                                9NAH60
                                                                                           RESULT 8
                                                                                                                                  ŏ
                                   g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           â
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
```

72;

qq	360	VGQANAAGDGSGQVHVAQGPAGANASDSNGVTIVQQQP 397	
οy	460	NDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSH 519	
Db	398	AVDLAAGANGTSAVQSQSGANIGSGANGISVVQSQNSPNIGSGAN 442	
οy	520	LILHSKGQRGGGVQIDGDITSKGGNLTIYSGGWVDVHKNITLDQGFLN 567	
QQ	443	GISVVQSQNGANIGAGASGISVVQSQNSPNIGSGVNGVIVVQSQNGANIGSGASG 497	
οy	268	ITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLNIISSVNN 627	
Dβ	498	ITVVQSQNGANIGSGASGISVVQSQSGPSIGSGVNGVTIVQSQSGANIGPGVSG 551	
φy	628	LTHNLSGIINISGNITINQTTRKNTSYWQTSHDSHWNVSALNLETGANFT 677	
QQ	552	IDVVQTQTLPNLSPGANGSSIVQVQTLPDIAADAGNVHVVQVQTGGNKV 600	
Οy	829	FIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIR 737	
QQ	601	FFORSATNVRSRTVQARSNENVGSG 624	
Οy	738	FLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTLNSHV 784	
QQ	625	- LANPSSAGKGSTLHADTLARNLSTSNVEVVATRGNAHVGAPLSWDSGNGLT 675	
Οy	785	RGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 840	
QQ	9 2 9	LTAERGDLRINGALTAQGENASLTLNAGQRPLRIDDSLSLTGQGARVEF 724	
Οy	841	ONSSSSITGNITIEKAANVTLEANNAPNOONIRDRVIKLGSLLVNGSL 888	
qq	725	- NSDKGYALABGTRITLSGKNAGFRANGRDYSVIQDLQQLRGIDRDLGGSYVLGN- 778	
οy	889	SLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGT 928	
qq	779	:     :   :   :	
δÿ	929		
Dp	836	RISADGAQATHYNQVGSLAAVNLGRIDNVNASDIRIAAASKLNSLGGLVALNLGSI 892	
Qy	975		
qq	893		
Οy	1026	ATSNANLTIKTKELKL	
Dp	932	:     : :   :   :   :   :   :   :   :	
٥y	1083	NNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDIT 1136	
Op	968	:     :	
Qγ	1137	SLKTVNITASEKUTTTAGSTINATNGKASITTKTGDISGTI 1177	
Dp	1022	:	
Qy	1178		
qq	1075		
Οy	1218	ISGNTVNVTANAGD	
qq	1133	:   :   :   :     :     :     :     :	
ΟŊ	1253	-GNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVT-LNTTGTLTTVAG	
ДQ	1192	GGNHSTLAASGNVTGGKGSRVGGLVGYNDAASLTNVSASGNVSASGSRAIGGLIG	
δλ	1303	SDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGS	
pp	1247		

```
TRIALGOUST FROM N.A.

C STRAIN—CO-92 / BIOVAR ORIENTALIS;

X MEDLINE—21470413; PubMed=115865360;

MEDLINE—21470413; PubMed=115865360;

A PARKHILO J., Wren B.W., Thomson N.R., Titball R.W., Holden M.T.G.,

A Parkhill J., Wren B.W., Thomson N.R., Cerdeno-Tarraga B.M., Bentley S.D., Brooks K.D., Cerdeno-Tarraga A.M.,

A Baker S., Basham D., Bentley S.D., Brooks R.D., Cerdeno-Tarraga A.M.,

Chillingworth T., Cronin A., Davies R.M., Davis P., Dougan G.,

Chillingworth T., Moule S., Oyston P.C.F., Quail M., Rarlyshew P.V.,

Leather S., Moule S., Oyston P.C.F., Quail M., Rathsfrord K.,

Simmonds M., Skelton J., Stevens R., Whitehead S., Barrell B.G.;

R Genome sequence of Yersinia pestis, the causative agent of plague.";

IN Mature 413:523-527(201).

R InterPro, IPR004899; Pertact_Sup.

R InterPro, IPR04899; Pertact_Sup.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1032 LDL----LVNGTALTSGTQGVQSALQQGGSTVA-----NAIHNYGLASSNSNGDSGLYVN 1082
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            138 NRYEGTTTVTAGELILGANGAFGQTSLLDIASGASANINGYSQTVGAVTNVGTVTLGSGG 1197
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1198 V--LTSGLLTNGGILDLTGGALNLTAGGASTVAGGLTGAGTLNI------N 1240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1241 GGNLSVSAANSGLSGQTHIADVASVTLTDTGTLGTSAVEVLGTLNLNGANAAMTN---- 1295
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1296 -- VLSGDG-TINTNAAVTLSGNNSFSGAHQIGTDGELTVGQASNLGASSATVNLGTLTSH 1352
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  128 VTSNQISQLKGILDSNGQVFLINPNGITIGKDAIIN------T 164
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         165 NGFTASTLDISNENIKARNFTFEQTK-------DKALAEIVNHGLITVGKDG 209
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    210 SYNLIGGKVKNEGVISVNGGSISLLAGQKITISDIINPTITYSIAAPENEAVNLGDIFAK 269
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              270 GGNINVRAATIRNQGKLS-AD--SVSKDKSGNIVLSAKE--GEAEIGGVISAQNQQAKGG 324
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        325 KLMITGDKVTLKTGAVIDLSGKE--GGETYLGGDER---GEGK------362
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ---NGI--QLAKKTSLEKGSTINVSG-----KEKGGFAIVWGDIALI------DG 401
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   8.1%; Score 602; DB 16; Length 3705;
21.7%; Pred. No. 7.8e-12;
21.7%; Miamatches 695; Indels 534; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     69 SGLQCMDVVHGTA-TMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENNNSAVFNR 127
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             14 NALVAVSELA--RGCDHSTEKGS---EKPARMKVRHLALKPLSAMLLSLGVTSIPQSVLA 68
                                                                                                                                                                                                                                                                                                                         Yersinia pestis.
Bacteria; Proteobacteria; gamma subdivision; Enterobacteriaceae;
                          1341 -------GSVTAATSSSVN--ITGDLNTVNGLNIISKDG 1370
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 PRINTS; PR01656; VACCYTOTOXIN.
Hypothetical protein; Complete proteome. 7765 Aa, 370479 MW; BD36DAB27F85F284 CRC64;
                                                                                                                                                                               082HA1;
01-MAR-2002 (TrEMBLrel. 20, Created)
01-MAR-2002 (TrEMBLrel. 20, Last sequence update)
01-UNN-2002 (TrEMBLrel. 21, Last annotation update)
Putative autotransporter protein.
                                                                                                                                                            PRT; 3705 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Best Local Similarity 21.7%; Pred. No. 7.8e
Matches 413; Conservative 260; Mismatches
                                                                                                                                                               PRELIMINARY;
                                                                                                                                                                                                                                                                                                                                                                                           NCBI_TaxID=632;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Query Match
                                                                                                                                                               Q8ZHA1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       363
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ò
     ò
```

qq	1353	LILNGVSESIANVLSGVAGSTVDIIGGADTALTANNSGFLGQYALAGNSKLTVASTN 1409	
δλ	402	NINAQG	
QQ	1410		
Qγ	443		
Q D	1470	ADATLNLDDIALFNHVLTGNGLLNVAKNDASTAF	
oy Dp	488	ISNYLKNAWTMNITASRKLIVUNSSINIGSNSHLILHSKQQRGGQVQIDG 536	
οy	537		
Dp	1582		
δý	586	ANAKIVAQGTVTITG6GKDFRANNVSLNGTG	
Dp	1637	N'IDLLVDGTAITSGTQGVESAIQQGGSTVANAIHNYGLTSSNGNGGSGLYVNYTLSALE 1696	
ογ	617	KGLNIISSVNNLTHNLSGTINISGNITINQTIRKNTSYWQTSHDSHWNVSAL 668	
Ср	1697	LLANGANALLLATESGLTANRVLNAELFGVGGLVVDAQNGALTLANGNNRYEGTTTVTAG 1756	
οy	699	NLETGANETFIKVISSNSKGLTTQYRSSAGVNENGVNGNN 708	
qq	1757	ELILGANGAFGQTSLLNIASGASANINGYRQTVGAVTNSGAVTLGNGGVLTSGLLTNGGI 1816	
ολ	709	SFNLKEGAKVNFKLKPNENMNTSKPLPIRFLANITATG 746	
QQ	1817	LDLTGGALNLAAGGSSTVAGGLTGAGTLNINGGDLAVSATNSGLSGQTHIADVASVTLTG 1876	
λŏ	747	GGSVFFDIYANHSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFS 806	
qq	1877	TGTLGTSAVEVLGTLNL-NGANAAMINVLSGGGVINTNAAVTLSGNNSFSG 1926	
Qy Db	807	LRQTKDDFYDGYARNAINSTYNISILGGNVTLGGQNSSSSITGN-ITIEKA 856	
à	957		
g G	1987	ANY LEANNARINGNIKUKUIKUKUIKUGELUNGSLEETIGERADIKGNITISESAIFKGKTRDT 916	
٥y	917		
qq	2033		
δ		IGGD-IINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITI 1013	
qq		ALFDHVLTGNGTLNVAKNLATTAFDFGSTVGGAFSGIVNLTNTTFALSADNAAALARATL 2146	
ر ب و		KKGIDGEDSSSDATSNANLTIKTKELKLTE-DLSISGFN 1051	
a ,		KLSDUSVITVGTTDRILHGLDLNGGTLIFDGSPPQSQANGVVTVTDLALNSGTISITGAG 2206	
ک خ خ	1052	KAEITAKDGRDLTIGNSNDGNSGAEAKTVIFNNVKDSKIS 1091	
3 ,		NWENERRYIPTNVSELEGUEGGELLEGLIDADNVIGNANDLELMINGTIISAGGGVQSTVQ 2266	
δ		ADGHNVTLNSKVKTSSSNGGRESNSDNDIGLTITAKNVEVN 1132	
අ		QGGYTVANATHNYGMTSNGGSGLYVNYTLSALELLADGANALLLATESGLTANRELN 2323	
δλ		KDITSLKTVNITASEKVTTTAGSTINATNGKASITTKTGDISGTIS 1178	
අු	4	AELSGVGGLVVDAQNGALTLANGNNRYEGTTTVTAGELILGANGAFGQTSLLNIASGA-S 2382	
ζ <del>ί</del>			
e e	2383 1	ANINGYROTVGAVINTGTVTLGNGGELTSTDTLINTGMINVTDGILNLENGGASSISGGL 2442	

```
1219 SGNTVNVTANAGDLTV----GNGAEINATEGAATLTATGNTL--TTEAGSSITSTKGQV 1271
                         1272 DLLAQNGSIA-----GSIN-AANVILN------TTGTLTTVAGSDIKATSGT- 1311
                                                                                                         1312 -----LVINAKDAK----LNGDA-----SGDSTEVNAVNA-----SGSGSVT 1344
                                                                                                                                                                                                 2561 NLGTLTSHLILNGVSESIANVLSGVAGSTVDIIGGADTALTANNSGFLGQYALAGNSKLT 2620
                                                                                                                                                                                                                                         1345 AAT-----SSSVNI--TGDLNTVNGLN-------IISKDG-RNT 1373
                                                                                                                                                                                                                                                                      1374 VRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNT 1433
                                                                                                                                                                                                                                                                                                                                                            2681 VIIDIADATLNL--DDIALFNHALTGNGLLNVAKNDASTAFDFGATVGGAFTGTVNLNNS 2738
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1032 LDL----LVNGTAITSGTQGVQSAIQQGGSTVA----NAIHNYGLASSNSNGDSGLYVN 1082
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          972 SGVVTVTDLALNSGTVNITGSGSWDNTDPLATNVSILEQDRAGSTLELINATNVTGDIDA 1031
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Query Match 8.0%; Score 594; DB 2; Length 3705;
Best Local Similarity 21.5%; Pred. No. 1.4e-11;
Matches 409; Conservative 262; Mismatches 695; Indels 538; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    69 SGLQGMDVVHGTA-TMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENNNSAVFNR 127
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                128 VTSNQISQLKGILDSNGQVFLINPNGITIGKDAIIN------T 164
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                165 NGFTASTLDISNENIKARNFTFEQTK-------DKALAEIVNHGLITVGKDG 209
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         210 SVNLIGGKVKNEGVISVNGGSISLLAGQKITISDIINPTITYSIAAPENEAVNLGDIFAK 269
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    14 NALVAVSELA--RGCDHSTEKGS---EKPARMKVRHLALKPLSAMLLSLGVTSIPQSVLA 68
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Bacteria; Proteobacteria; gamma subdivision; Enterobacteriaceae;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Henderson I.R., Nataro J.P., Cappello R., Stein C.; "Evolutionary origins of the autotransporter proteins."; Submitted (APR-2000) to the EMBL/GenBank/DDBJ databases. EMBL: AJ27731; CAC14227.1; -. HSSP; P22629; 1SWG.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Pfam; PF03212; Pertactin; 1.
PRINTS; PR01656; VACCYTOTOXIN.
SEQUENCE 3705 AA: 370756 MW; 714FDF16455968C9 CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                  1434 ITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDG 1475
                                                                                                                                                                                                                                                                                                                                                                                                                           2739 TFDLSGNNTTVLAQATLKLSSGNLT-SVGNGVQNIGTLAMNG 2779
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              01-WAR-2001 (TrEMBLrel. 16, Created)
01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
01-JUN-2002 (TrEMBLrel. 21, Last annotation update)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PRT; 3705 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      InterPro; IPR004899; Pertact_sup.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         STRAIN-CO-92 BIOVAR ORIENTALIS;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             PRELIMINARY;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Yersinia pestis.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              NCBI_TaxID=632;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               YapH protein.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Yersinia.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Q9F285
                                                                                                                                                                                                                                                                                                                                                                                                  δy
                                                                                                                                                           δ
                                                                                                                                                                                                   Dp
                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ò
```

1240	324	7	362 1352	401	442	487	1523	536	585	1636	919	1696	668	46/1	708	746	1876	806 1926	928	1986	916	2032	996	2084	1011	2144	1049	108	TOS
VLTSGLLTHGGILDLTGGALNLTXGGASTVAGGLTGAGTLNIN	GGNINVRAATIRNOGKLS-ADSVSKDKSGNIVLSAKEGEAELGGVISAONQQAKGG	1 1 1 1	KLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGEGK	NGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDG 	NINAQGSGDIAKTGGEVETSGHDLFIKDNAIVDAKEWLLDF	DNVSINAED-PLENNTGINDEFPTGTGEASDPKKNSELKTTINTT	LTGNGLINVAKNDAST	ISNYLKNAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGVQIDG	FALSADINATION AND AND AND AND AND AND AND AND AND AN	TDLALNSGTISITGAGNWENEHPV	ANAKIVAQGTVTITGEGKDFRANNVSINGTG	::    :  :  :  :  :  :	KGLNIISSVNNLTHNLSGTINISGNITINOTTRKNTSYWOTSHDSHWNVSAL	ALT LANGNNKY EGT	NLETGANFTFIKYISSNSKGLTTOYRSSAGVNFNG	SFNLKEGAKVNFKLKPNENMNTSKPLPIRFLANITATG	LDLTGGALNLAAGGSSTVAGGLTGAGTLNINGGDLAVSATNSGLSGQTHIADVASVTLTG	GGSVFFDIYANHSGRGAELKMSEINISNCANFTLNSHVRGDDAFKINKDLTINATNSNFS   ::       : :       : :       : :           TGTL	LRO TKDDFY	AHQIGTDGELTVGQASNLGASSATVNLGTLTSHLILNGVSESIANVLS	ANVTLEANNAPNQQNIRDRV	- K	LNITGNFTNNGTAEINIT			DIALLDHVLTENGTLNVAKYLATTAFDXGSTVGXXFSGIVNLTNTTFALSADNAAALARA	TIKKGIDGEDSSSDATSNANLTIKTKELKLTE-DLSISG	TENESCOS TIL VOI LUCATED COLOR DE COCOS COLOR DE COLOR DE COCOS COLOR DE COLOR DE COLOR DE COLOR DE COLOR DE COLOR DE COLOR DE COLOR DE COLOR DE COLOR DE COLOR DE COLOR DE COLOR DE COLOR DE COLOR DE CO	FNKAEITAKDGRDLTIGNSNDGNSGAEARIVIFNNVNDSN         : :
1198	270	1241	325	363 1353	402	443	1470	488	F37	1582	586	1637	617	1697	1757	709	1817	747	807	1927	857	1987	917	2033	967	2085	1012	C 14.0	1050
QQ	λō	Dp	Oy.	Qy	γο α	3 8	qq	Oy St	3 8	S Q	δy	Dp	δ	Q D	Oy Dp	οy	QQ	Oy Db	ò	g q	δý	qq	Qy	qq	δλ	qq	Oy 5	2 2	ολ

```
83;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           2619 LTVASTNNLGASSSVALAGTGDTLSLSGFNGTFGNSVTGSGVLQVTDDAEVTLTSSNGVS 2678
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2679 NAVIIDIADATLNL--DDIALFNHALTGNGLLNVAKNDASTAFDEGATVGGAFTGTVNLN 2736
                                                                                                                                                                                                                                                                                                                                                                                                                                                             1372 NIVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPN 1431
                                                                                                                                                                                                                                                                                                  2441 GLTGNGI-LNIKGGDFTISIDNNGLAGQTNISDGASVFLGNGGTIIGTGNLGSSVIDVLG 2499
                                                                                                                                                                                                                                                                                                                                                       1270 QVDLLAQNGSIA-----GSIN-AANVTLN------TTGTLTTVAGSDIKATSG 1310
                                                                                                                                                                                                                                                                                                                                                                                              2500 DLNLVADN-SLANVISGDGTINTTATVTLSGNSSFSGAHQIGTNGELTVGQASNLGASSA 2558
                                                                                                                                                                                                                                                                                                                                                                                                                                   1311 T------EVINAKDAK----LNGDA-----SGDSTEVNAVNA------SGSGS 1342
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1343 VTAAT-----SSSVNI--TGDLNTVNGLN------------IISKDG-R 1371
                                                                                                                                                                                          1177 ISGNTVSVSATVDLTTKSGSKIEAKSGE------ANVT-----SATGTIGG 1216
                                                                                                                                                                                                                                 2382 -SANINGYRQTVGAVTNTGTVTLGNGGELTSTDTLINTGMINVTDGILNLENGGASSISG 2440
                                                                                                                                                                                                                                                                         1217 TISGNTVNVTANAGDLTV----GNGAEINATEGAATLTATGNTL--TTEAGSSITSTKG 1269
                                    1090 ISADGHNVTLNSKVKTSSSNGGR-----ESNSD-----NDTGLTITAKNVE 1130
                                                                     2265 VQQGGYTVANATHNYGMTSNGGSGLYVNYTLSALELLADGANALLLATESGLT---ANRE 2321
                                                                                                                1131 VNKDITSLKTVNITASE--------KVTTTAGSTINATNGKASITTKTGDISGT 1176
                                                                                                                                                     2322 LNAELSGVGGLVVDAQNGALTLANGNNRYEGTTTVTAGELILGANGAFGQTSLLNIASGA 2381
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Query Match
8.0%; Score 593.5; DB 2; Length 4919;
Best Local Similarity 23.0%; Pred. No. 2e-11;
Matches 385; Conservative 226; Mismatches 604; Indels 459; Gaps
2205 AGNWENEHPVTPPNVSLLEQDRGDILLQLIDADNVTGNANDLELMINGTTISAGQGVQST 2264
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  MEDITINE-99030326; PubMed-9811662; Ward C.K., Lumbley S.R., Latimer J.L., Cope L.D., Hansen E.J.; "Haemophilus ducreyi secretes a filamentous hemagglutinin-like
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Bacteria; Proteobacteria; gamma subdivision; Pasteurellaceae;
Haemophilus.
NCBI_TaxID=730;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              EMBL. ARO57696; AAC79761.1;
InterPro; IPR001951; VerHae_suurfag.
InterPro; IPR001030; Zn_WTpeptdse.
Pfam: PF03543; VerHae_suurfAg; 1.
SMART: SM00235; ZnMc; 1.
SEQUENCE 4919 AA; 542595 MW; 5779201455CA69A0 CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1432 NTITVNTQNEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDG 1475
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        2737 NSTFDLSGNNTTVLAQATLKLSSGNLT-SVGNGVQNIGTLAMNG 2779
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         01-MAY-1999 (TrEMBLrel. 10, Created)
01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
01-UN-2002 (TrEMBLrel. 21, Last annotation update)
Large supernatant protein 2.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  PRT; 4919 AA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                J. Bacteriol. 180:6013-6022(1998).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      PRELIMINARY;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     LSPA2.
Haemophilus ducreyi.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      092HL0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  RESULT 11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            g
                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Ω
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Óγ
                                                                                                                          οy
                                                                                                                                                          d
                                                                                                                                                                                                    δλ
                                                                                                                                                                                                                                    qq
                                                                                                                                                                                                                                                                                Qγ
                                                                                                                                                                                                                                                                                                                  Dp
                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                          οy
```

Q O	3 NKRYKLIFSKVKNCLVPVAENIKSASGNSGSSSNSKIAEDQEEEPDSLACSLSPLSSSIH 62
ΟŻ	45 LAL
qq	63 LGLHNHSPLKVFKGKNLSVVLLSLMPAMQVWADSSNAIVDHSHGAKQTAVDERDPK 118
δ i	,
QQ	
oy Db	121 NSAVENRYTSNQISQLKGILDSNGQVPLINPNGITIGKDAIINTNGFTAST 171   :  :   :    :     :
οy	
qq	::: :: :: ATNGLSHFDVVAKNIEQQGKV
δλ	OKITISDIINPTITYSIAAPENEAVNLGD
QQ	279 SIEGDSKPAKLANVTFAAGNLTYDVNTRDVNRNT 312
οy	278 ATIRNQGKLSADSVSKDKSGNIVLSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKT 337
qq	313NPKKPITDNTKKDNIAISGESAGSMYGRNIKFIVT 347
δy	338 GAVIDLSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKGSTINVSG 383
Вр	348
Οy	384 KEKGGFAIVWGDIALI-DGNINAQGSGDIAKTGGFVETSGHDLFIKDNAIVDAKEWLLDF 442
οp	389 KDIELANNGQIHADQQLILNATGHVKLNDGSSVISNNNLGISALNLTL 436
ΟŊ	443 DNVSINAEDPLFNNTGINDEFPTGIGEASDPKKNSELKTTLTNTII 488
Dp	437 ENATVSANNLSFRVTNDTKLNNLSKVSARAADLQSGNLNLDKASVLAHKLTLNISNDVSL 496
oy Dp	489 SNYLK-NAWIMNITASRKLIVNSSINIGSNSHLILHSKGGRGGV 532
δ	3 5
QD	TLNNDSELAANNLTLNVTKNVTLNDASKL
Οy	
QQ	611 LTFKKVKNVTLNNDSELAANNLSLNASHNVTLNNKSKLSAQKADIKAVNLTLNDTTELTA 670
0y	617 KGLNIISSVNNLTHNLSGTI-NISGNITINQTTRKNTSYWQTSHDSHW-NV 665
qa	671 KNLDINSTTITNNGTIAGIFANITTEKLNNKEKALILAEQNLNFTVNGSHYENK 724
Qy	666 SALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKE 714
qq	725 GDIVSKDKATVTESKNSDFTSNGSKLVNAQNQLKVNVNNFTISQGDDITLIGNVTLN-AS 783
δý	715 GAKVNFKLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEI 770
qq	784 GTFTNSGNLTTVKTLDVGDLQNFTNKGNLTVGEDLHIKSKTKITNDGKLISIKNL 838
οy	771 NISNGANFILNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARN 821
QQ	839 NISSEADFINNGTLEGIEALKIATKGNFTNKEKAILASNSLLDISVAEGKKTFNNG 894
οy	LEANNAPNQQNIRDRVIKL
qq	895 TIESGKNLNITNTGAFLNVDNATIRSEGVLNITSTGNVSNNGT 937
οy	LLVNGSLSLTGENADIKGNLTISESATFKGKTRDTL  :
a G	938 LISNERLNITS

```
971 KQGNITNKNLIASRQQLNLTAVADNITNDSNISNKIAVLHSLGNISLNSKDQVYNLGEIY 1030
                                                                                         987 IGGNISQKEGNLTISSDKINITKQITIKK....-GIDGEDSSSDATSNAN 1031
                                                                                                                                        1031 AGNNISVKAHQL---KNDVKLMGDITTKTKEGQASYKLYQASNGGHFGNDGSS-GYSEGD 1086
                                                                                                                                                                                                                 1032 LTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKIS 1091
                                                                                                                                                                                                                                                                           1092 ADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKTVNITASEKVTT 1151
                                                                                                                                                                                                                                                                                                                    1129 NRG---TINVKNKLSYDSDVSFENNMOSQKVDLYTKIFEAKSDIE--LTFKTNGTHPVYL 1183
                                                                                                                                                                                                                                                                                                                                                                   1152 TAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTT-KSGSKIEAKSGEANVTSA 1210
                                                                                                                                                                                                                                                                                                                                                                                                            1184 NFKSNNNEKKYRNSENTKNFKSIGDLINEALSDSAPEALEAYYSGS----SSNYINPVSY 1239
                                                                                                                                                                                                                                                                                                                                                                                                                                                          1211 TCTIGGTISGNTVNVTANAGDLTVGNG--AEINATEGAATLTATGNTLTTEAGSSITSTK 1268
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1240 LAALGNANNSSNPHYLNTALKHILGNGWODDLKKQENIKVLKQKWEDFKKDKGAS---- 1294
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1269 GQVDLLAQNGSIAGSINAANVTLNTGTLTTVAGSDIKATSGTLVINAKDAKLN-GDASG 1327
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1295 KMLDLYPNTDKEKAKI-FAGIIRNGNDTISDVESEDFKKKYSKFQ-NGEWAKNDTGTDSY 1352
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1328 DSTEVN-----AVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGK--E 1380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1353 DSTKASEKYKKVENVDHKENI---DEHKLNIGKHEITVPGVSFENLNNKNMDHQPDKLGE 1409
939 KLGNVTNDG-----DLNITTHAKR--NQRSIIGG-DIINKKGSLNITDSN---NDAEIQ 986
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Ouery Match 7.6%; Score 561; DB 16; Length 2737;
Best Local Similarity 22.4%; Pred. No. 1.2e-10;
Matches 326; Conservative 187; Mismatches 546; Indels 396; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Salanoubat M., Genin S., Artiguenave F., Gouzy J., Mangenot S., Arlat M., Billault A., Brottier P., Camus J.C., Cattolico L., Chandler M., Choisne N., Claudel-Renard C., Cunnac S., Demange N., Siguier P., Thebault P., Whalen M., Robert C., Saurin W., Schlex T., Siguier P., Thebault P., Whalen M., Wincker P., Levy M., Weissenbach J., Boucher C.A.;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1381 IEVKYIQPGVASVEEVIEAKRVLEKVKD--LSDEERETLAKLGVSAVRFVEPNN 1432
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Plasmid megaplasmid.
Bacteria; Proteobacteria; beta subdivision; Ralstonia group;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Nature 413:497-5022002).
EMBL; AL646085; CAD18690.1; -.
InterPro; IPR000566; Lipocln_cytFABP.
PROSTIE: PS00213; LipocALIN; UNKNOWN_1.
Plasmid; Complete protecome.
SEQUENCE 2737 As: 268490 MW; 12F383C02C101D0C CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 01-MAR-2002 (TrEMBLrel. 20, Created)
01-MAR-2002 (TrEMBLrel. 20, Last sequence update)
01-UNN-2002 (TrEMBLrel. 21, Last annotation update)
Probable hemagalutinin-related protein.
RSP1539 OR RS05770.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Ralstonia solanacearum (Pseudomonas solanacearum).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PRT; 2737 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                MEDLINE-21681879; PubMed-11823852;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PRELIMINARY;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    SEQUENCE FROM N.A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           NCBI_TaxID=305;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Q8XPU7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 RESULT 12
                                              엄
                                                                                                                                   qq
                                                                                                                                                                                                                                                                         οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
```

64;

Qy Db 1	82 TMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENNNSAVFNRVTSNQISQLKG-:    :	TVE	138 212
Qy 1 Db 2	139 ILDSNGQVFLINPNGITIGKDAINTNGFTASTLDISNENIKARNFTFEQTKDKALAEI :	>->	198 270
Oy 1 Db 2	199 NHGLITYGKDGSVNLIGGKVKNECVISVNGGSISLLAGQKITISDII 		245 319
0y 2 Db 3	246 NPIITYSIAAPENEAVNLGDIFAKGGNINVRAATIRN		288
	0 0		342 435
	e 9	AIVWGDIALID ::  :  : SVSAGNSANLG	400
Oy 4	GNINAQGSGD   :    GNLNAASIAVTAQGKDGTGD		444
Qy 4	445 VSINAEDPLENNTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTWNITASR	KNAWTMNITASR  :   QANLTASA	504
Qy S	ILHSK : : AIQAN	VDVHKNITLDQ- : :  i! LTAGQNATLGAA	563 635
oy da	564GFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGL	KDFRANNVSLNGTGKGL :    :::  : -NVSANRIAMQAAGR	619 688
oy QQ	620 NIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHDSHMNVSALNLETGANFT	ALNLETGANETFI	679
Q Q	680 KYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIR 1	NMNTSKPLPIRFL	739
Oy Db	ANITATGG :  VTT	DAFKINKDLTIN :  GTASVN	799
oy Oy	800 ATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGGQNSSSSITGNITIEKAANV 192AGGNLSTAGQIGSNGTLTLNAGONL	ITGNITIEKAANV   : : GTLTLNAGONL	859 816
y do	860 TLEANNAPNQQNIRDRVIKLGS-LLVNGSLSLTGENADIKGNLTISESATFKGKTRDTLN   :     :     :     :   :   :   :   :	SATFKGKTRDTLN	918 857
yo da	919 ITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQRSI-IGGDIINKKGSLNIT :	DIINKKGSLNIT :  ::  QVKGKQVALTAN	977
Qy	978 DSNNDAEIQIGGNISQKEGNLTISSDKINITKQITI-KKGIDGEDSS	SS :: TAGRNLTVNGAA	1023 965
Qy 1 Db	1024 SDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAK i	-NDGNSGAEAK  :   : YAGRNAGLVAQGGN	1078 1022

```
61;
                                             1023 ATVSGNLTSLGKASIGSGGNTTLSGQLKTGGDLQASAANALSVAQLNYVGGNAILRGTDI 1082
                                                                                                                                                                       1155 STINATNGKAS-ITTKTGDI--SGTISGNTVSVSATVDLTTKSGSKIEAKSGEANVTSAT 1211
                                                                                                                                                                                                                  1142 MVTNAGMLAANQLTVSATDLVNRGTVGGQAVKLNTTGNLDNAGGLVVGSQTLDVTAGALT 1201
                                                                                                                                                                                                                                                           1212 GTIGGTISGN-----ATE 1244
                                                                                                                                                                                                                                                                                                 1202 SNRGGTFFGGDLAGKSPTTGNLTFTVNGGAGSFNNAGGQLLAGNNLTLNTPNQAFDPSAA 1261
                                                                                                                                                                                                                                                                                                                                                 1245 GAATLTATGNTLTTEAGSSITSTKGQVDLLAQNGSIAGSINAA------NVTL 1291
                                                                                                                                                                                                                                                                                                                                                                           1292 NTTGTLTT----VAGSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAAT 1347
                                                                                                                                                                                                                                                                                                                                                                                                                                                              STRAIN-ATCC 15692 / PAO1;
STRAIN-ATCC 15692 / PAO1;
MEDLINE-20437337; Pubmed-10984043;
Stover C.K., Pham X.-O.T., Erwin A.L., Mizoguchi S.D., Warrener P., Stover C.K., Pham X.-O.T., Erwin A.L., Miragle W.O., Rowalik D.J., Lagrou M., Hickey M.J., Brinkman F.S.L., Hufnagle W.O., Rowalik D.J., Lagrou M., Barber R.L., Goltry L., Tolentino E., Westbrock-Wadman S., Yuan Y., Brody L.L., Coulter S.N., Folger K.R., Kas A., Larbig K., Lim R.M., Smith K.A., Spencer D.H., Wong G.K.-S., Wu Z., Paulsen I.T., Reizer J., Saler M.H., Hancock R.E.W., Lory S., Olson M.V.; "Complete genome sequence of Pseudomonas aeruginosa PAO1, an
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  44 GATALAPAYALPS---GGTVVGGSANGEIHLSGGNSLSVNQKVDKLIANWDSFSVAAGER 100
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1079 -TVTFNNVKDSKIS-ADGHNVTLNSKVKT-----SSSN------GGR------ 1112
                                                                                      1113 -----ESNSDNDT-----GLT1TAKNVEVNK----DITSLKTVNITASEKVTTTAG 1154
                                                                                                                                 1083 AVGSAAGQSNAVQGTLDAVASRGLTL-AGNSNANALNLGGATIVNQGSTLATQRATVSGG 1141
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      58 GVTSI-PQSVLASGLQGMDVVHGTATMQV---DGNKTIIRNSVDAII-NWKQFNIDQNEM 112
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Query Match 7.5%; Score 553.5; DB 16; Length 1018; Best Local Similarity 22.6%; Pred. No. 7.4e-11; Matches 301; Conservative 181; Mismatches 453; Indels 399; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSE---KPARMKVRHLALKPLSAMLLSL 57
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1 MNKCYAL-----AUNVSOGCWNVVSEGSRRRGKPAGAKA-----AIASVLALL 43
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Bacteria; Proteobacteria; gamma subdivision; Pseudomonadaceae;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               opportunistic pathogen.";
Nature 406:959-964(2000).
BMBL; AE004824; AAG07469.1; -.
COMplete proteome.
SEQUENCE 1018 AA; 100433 MW; F373734D77FFA94D CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          01-MAR-2001 (TrEMBLrel. 16, Created)
01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
01-00T-2001 (TrEMBLrel. 18, Last annotation update)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PRT; 1018 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1348 SSSVNITGDLNTVNG 1362
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1373 GSNYDNQGGKTQANG 1387
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 PRELIMINARY;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Pseudomonas aeruginosa
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Probable adhesin.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    NCBI_TaxID=287;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Pseudomonas.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    90WH60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      RESULT 13
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      рp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        qq
                                                                                                                                                                                                                                                                                                                                                                                                                                          δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δλ
                                                                                                                                 g
                                                                                                                                                                                                                  q
                                                                                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                                                                    δ
                                                                                                                                                                            οy
                                                                                                                                                                                                                                                                   δy
```

VIFNQPSSSSIALNRVIGTKASDIQGRIDANGQVFLVNPNGVLFGRGAQVNVGGLVASTL 160		KFTGPSTNGVLNHGGAITAAEGGSIALLGAQVDNRGTVLAQ 215	GGSISLLAGOKITISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAAT 279   :     :   ;   :     :     WGGVGLGAGSDLTLNFDGNKLLDIRVDAGVANALASNGGLLKADGGRVLMAARTANALLN 275			LALGONIEGO GETTLEGODERGEGENNGIQUARKTSLEKGSTINVSGKEKGGFAIV 392     :-   :-   :-   :-       :-       :-       :-	AED		PLENNTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTVNSS 511	SKGGNLTIYSGGWVDVHKNITLDQG		FINITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLN 620	VLGGNILGGSYYCTALQSIGGPAG 532	F-1	GNSIGNLSIS557	YISSNSKCLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFLA 740	SNGANFTLNSHVRGDDAFKINKDLTINA 80	NSGRIANVSASGVSVVGSRLRSNALGGLVGRNISGQI 632	TNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGGQNSSSITGNITIEKA-ANV 859  ::	KLGSLLVNGSLSLTGENADIKGNLTISESATFKGKTRDT :	THE THE THE TANK THE	LINIO NETRINITACIONEGENTINDEDENTITETARKNOKSILGGOLINKKGSE, 974	NITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGEDSSSDATSNANL 1032	:       :       :	TIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISA 1092	SGGSNSRVGGLIGHNLGGSVAHAISRGDVS 859	NDTGLTITAKNVE		933
	DIS										:    ::    IDINDKIVLGGAGSALAMDAGE	FLNITAASVAFEGGNNKARI	LAQLQAINKNLDGLYVLGGN	IISSVNNLTHNLSGTINISGNITINQ	VFSGTLDGLGNSIGNLSI	YISSNSKGLTTQYRSSAGVNFNGV 	NITATGGGSVFFDIYANHSGRGAE	GINSGRIAN	TNSNFSLRQTKDDFYDGYARNAINS  ::	TLEANNAPNQONIRDRVIKLGSLL :   : HVAAOSTERNS	Ē	LINVGGLVGYNMEGHVSDSSASGQV	NITDSNNDAEIQIGGNISQKEGNL	:      :     LATGGLIGKAEGNG	TIKTKELKLTEDLSISGFNKAEIT	AIETAEATGKVSGGSNSRVGGLIGHNL-	DGHNVTLNSKVKTSSSNGGRESNSD 	AGSTINATNGKASITTKTGDISGT	:::
101	173		228	280	7 7	335	393	382	452	512	441	565	494	621	533	681 558	741	594	801	860	917	718	975	176	1033	819	1093	1153	890
Db	Q	3	oy D	δδ	3 8	6 8	ÓΥ	qq	9. 0.0 0.0	οy	ОÞ	οy	q	δ	අ .	oy oy	οy	QQ	Oy Dp	9 9	ò	g 8	Qγ	Ωp	δy	qq	Oy Db	οy	QQ

```
82;
1213 TIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEAGS-SITSTKGQV 1271
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               Kaneko T., Nakamura Y., Sato S., Asamizu E., Kato T., Sasamoto S., Natanabe A., Idesawa K., Ishikawa A., Kawashima K., Kimura T., Kishikawa C., Kohara M., Matsumoto M., Matsuno A., Mochizuki Y., Nakayama S., Nakazaki N., Shimpo S., Sugimoto M., Takeuchi C., Yamada M., Tabata S.; Complete genome structure of the nitrogen-fixing symbiotic bacterium
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              56 SLGVTSIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQF 115
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       861 SLGGVPI-----NITGDNVAHDVAISDPGGAATLINSGSGAVVI----AANGNSLLDF 909
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          116 LQENNNSAVFNRVTSNQISQLKGILDSN------GQVFLINPN-----GI-TI 156
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     910 NISGGSDAGINATSINGLT-IQCVTVSNVDTGLFLGSVTGTVSVDNLNVQNASQTGIELL 968
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    157 GKDAIINTNGFTASTLDISNENIKARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGG 216
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         217 KVKNEGVISVNG-----GSISLLAGQKITISDIIN--PTITYSIAAPENEAVNLGDIF 267
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 268 -AKGGNINVRAATIRNQGKLSADSVSKDKSGNI-VLSAKEGEAEIGGVISAQNQQAKGGK 325
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          326 LMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKGSTINVSGKE 385
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Query Match 7.4%; Score 548; DB 16; Length 3930;
Best Local Similarity 21.9%; Pred. No. 4.8e-10;
Matches 366; Conservative 227; Mismatches 641; Indels 441; Gaps
                                                                                                                                                                                                                                                                                                                                   Rhizobium loti (Mesorhizobium loti).
Bacteria: Proteobacteria: alpha subdivision; Rhizobiaceae group;
Phyllobacteriaceae; Mesorhizobium.
NCBL_TaxID=381;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                9ACD1ACA185BF712 CRC64;
                                                                                                                                                                                                                                        01-OCT-2001 (TrEMBLrel. 18, Created)
01-OCT-2001 (TrEMBLrel. 18, Last sequence update)
01-UNN-2002 (TrEMBLrel. 21, Last annotation update)
Hypothetical protein ml14444.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 INTERPRO; IPR003880; PPantne_attach, PROSITE; PS00327; BACTERIAL_OPSIN_RET; UNKNOWN_1. PROSITE; PS00120; IIPASE_SER; UNKNOWN_1. PROSITE; PS00012; PHOSPHOPANTETHEINE; UNKNOWN_1.
                                                                                                                                                                                                           PRT; 3930 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Hypothetical protein; Complete proteome.
SEQUENCE 3930 AA; 380662 MW; 9ACDIAC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Mesorhizobium loti.";
DNA Res. 7:331-338(2000).
EMBL. AP003004; BAB51100.1; -.
InterPro; IPR001425; Bac_rhodopsin.
InterPro; IPR000734; Lipase.
                                                                                                                                                                                                                                                                                                                                                                                                                                           STRAIN=MAFF303099;
MEDLINE=21082930; Pubmed=11214968;
                                                                         1272 DLLAQN--GSIAGS 1283
                                                                                                              973 DFKPOSHYGOIYGA 986
                                                                                                                                                                                                                                                                                                                                                                                                            [1]
SEQUENCE FROM N.A.
                                                                                                                                                                                                       Q98E20
                                                                                                                                                                  RESULT 14
Q98E20
                                      qq
                                                                           Qγ
                                                                                                              QQ
                                                                                                                                                                                                                            ద
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Óγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
```

```
7.3%; Score 543; DB 16; Length 3165;
arity 22.5%; Pred. No. 5.6e-10;
onservative 222; Mismatches 535; Indels 524; Gaps 85;
-----SSVNITGDLNTVNGLNII-----SKDG--RNTVRLRGKEIE- 1382
                                                                                                                                                                                                                                                                                                LPTSGDYNFNDVNFSGDTSNLSAVRVYYVTAGGTGDGSLANPGSYLGAQAST 2238
                                                                                                                                                                                                                                                                                                                                                                                                                                                     PGVASVEEVIEAKRVLEKVKD-----LSDEERETLAKLGV----SAV 1425
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          VVHGTATMQVDGNKTII----RNSVDAIINWKQFNIDQNEMVQFLQENNNSA 123
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Q-----ISQLKGILD----SNGQVF----LINPNG----ITIGKDAIIN 163
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                EGASLFYATSKAKAILDEDYKVTNGDAISTAVLVANNGANVEIASGKKLETN 514
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     TLDISNENIKARNFTFEQTK-DKAL-----AEIVNHGLITVGKDGSVNLIG 215
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NGTVGFTSVAKNNGTLISTRIDKGIGIYTSAANGENSGTITMONKNAVGILG 574
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               EGVISVNGGSISLLAGQKITISDIINPTITYSIAAPENEAVNLGDIFAKGGN 272
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    TGKIELEAVS---SAGVYAEDSNWTNSGTTSEIIV--NKEASVG-IYAKETS 628
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      :|:||: : || | |||||||: || : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || | : || : || | : || | : || : || : || | : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || : || :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       PTKFNNTFKIESGKTLDVELGKNSTFGLLNGNN-TVTNSPLLSKYLNNNTSD 454
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                RNQGKLSADSVSKDKSGNIVLSAKEGEAEI-----GGVISAQNQQAKGGKLM 327
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  KTGAVIDLSG--KEGGETYLG--GDE-----RGEGKNGIQLAKKTSLEKGST 378
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Anderson I., Ivanova N., Reznik G., Los T., Lykidis A., Anderson I., Ivanova N., Grechkin G., Zhu L., Thu L., Kogan Y., Cardner W., Grechkin G., Zhu L., Thu L., Kogan Y., Chaga O., Goltsman E., Bernal A., Souza M., Walunas T., Pusch G., Haselkorn R., Kyrpides N., Overbeek R.; The oral bacterium Fusobacterium and and Jysis of the oral bacterium Fusobacterium 184.2005-2018(2002).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ITVNTQNEF-TTRP-----SSQVI--ISEGKACFSSGNGARVCTNV 1471
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     eome.
65 AA; 331849 MW; 6DFE562C8490DEA1 CRC64;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        TrEMBLrel. 21, Created)
TrEMBLrel. 21, Last Sequence update)
TrEMBLrel. 21, Last annotation update)
Outer membrane protein family.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           PRT; 3165 AA.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       nucleatum (subsp. nucleatum).
obacteria; Fusobacterium.
856;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           RELIMINARY;
```

Dp Ov	737		692
2 2		SINAEDPLENNTGINDEFPTGTGEASDPKKNSELKTTLINTTISNYLKNAWTM  ::       GISVDGSSTGEND	498 783
	499	NITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITSKGGNLTIYSG :	550
	551 838	KDFRANNV     KTGSAGIY	610 882
	611 883	_	667 925
	668	GVNFNGVNGNMSFNLKEG	715
	716 978	AKVNFKLKPNE	977 759
	760	HVRGDDAFKINKD-LTINAINSNFSLR 	808
	808	YARNAINSTYNISILGGNVTLGG	
	1084	S H·	1143 891
	1144	KGTVITEKKISAGILAEIDEANGG-TVS	1184
	1185	GEN-ETTGTIIVSEETSAGRIKGIENIGNETUNGIABINITGGVKKGNVTNGDE GEN-ETTGVKKGNVTNGDE GEN-ETTGTIIVSEETSAGMLGKVKSAVTASTAKL-SLINKKDI 1	949 1226
	950	NITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGG 9 1	989 1286
	990	NISQKEGNLFISSDKINITKQITIKKGIDGEDSSDATSNANLTIKTKELKL 1   :       :	1041
	1042	TEDLSISGFNKA-EITAKDGRDLTIGN	1070
	1071	SADGHNVTLNSK	1102
	1407	KS	1460
	1103	VKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSL 1	138
	1139	KTVNITASEKVTTTAGSTINATUCKASITTKTGDISGTISGNTVSV 1   :-	1184
	1185	ANVTSATGTIGGTISGNTVNVT	22
	1576	-	62
	1227	ANAGDLTVGNGABINATEGAATLTATGNTLTTEAGSSITSTKGQVDLLAQ 1	276

```
Db 1630 SPSDKAKYAIGIYADAQGTVG------TPYNITT-----PITAGKSGVGIFADKDSNINYT 1679

Oy 1277 -----NGSIAGSINAANVILNTTGTLTTVAGSDI--KATSGTLVINAKDAKLNGDASGD 1328

Db 1680 GNMEIGDGTTAGTGIFITKKIGATGGKVTLGTNTIKLKGTKGVVAIASEGTTFNG---GN 1736

OY 1329 ST-EVNAVNASGSGSVTAATSSSVNI---TGDLNTVNGLNIISKDGRNTVRLRGKEIEVK 1384

Db 1737 ATIELVGSNIOGVG-VYAKKGSTVNIDHWTFNNNGNSAEEVRSEEGRVYIN-ANKNLKPK 1794

OY 1385 YIOPGVASVEEVIEAKRVLEKVKDLSDEBRETL 1417

Db 1795 MVLTHVINGETSIATGKTVTSVNDGSITAKENI 1827

Search completed: March 24, 2003, 15:24:13
```

```
GenCore version 5.1.4_p5_4578 Copyright (c) 1993 - 2003 Compugen Ltd.
```

OM protein - protein search, using sw model

Run on:

March 24, 2003, 15:23:05 ; Search time 26 Seconds
 (without alignments)
5461.175 Million cell updates/sec

US-10-092-880-4 Perfect score:

1 MNKIYRLKFSKRLNALVAVS......CFSSGNGARVCTNVADDGQP 1477 Sequence:

Gapop 10.0 , Gapext 0.5 BLOSUM62 Scoring table:

283224 seqs, 96134422 residues Searched:

Total number of hits satisfying chosen parameters:

Minimum DB seq length: 0 Maximum DB seq length: 200000000

Post-processing: Minimum Match 0% Maximum Match 100% Listing first 45 summaries

Database :

PIR\_73:\*
1: pir1:\*
2: pir2:\*
3: pir3:\*
4: pir4:\*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

### SUMMARIES

		æ			SUMMARIES	
Result No.	Score	Query	Length	DB	DI	Description
-	7327	98.	1477		B43855	high-molecular-wei
5	4957	. 99	1536		A43855	high-molecular-wei
3	876	11.	1910		AF0394	probable adhesin h
4	744.5	10.1	2154		F83068	hypothetical prote
S	636.5	80	1417		A83080	hypothetical prote
9	602		3705		AD0123	probable autotrans
7	593.5	ω.	4		T31105	hypothetical prote
æ	555.5	7.	-		A35140	hemolysin A precur
σ	553.5	7.	1		H83135	probable adhesin P
10	531.5	7.	-		B99789	hemagglutinin/hemo
11	531.5	7.	7		E85649	hypothetical prote
12	523.5	7.	4		T31102	filamentous hemagg
13	520	7.0	1975	7	B81192	hemagglutinin/hemo
14	520	7.	N		AC0304	probable hemolysin
15	517.5	7.			G81044	hemagglutinin/hemo
16	517.5	7.	(1		C48399	type tran
17	512.5	9	(1		B71704	surface
18	511	9	(1)		A41477	
19	508	9	(4		B81989	hypothetical prote
20	504	٠,	(*)		AE0074	probable adhesin Y
21	486.5	9			S54699	hemopexin-heme com
22	485	9	(1		D82671	surface protein XF
23	480	9	_		T43072	1
24	477.5		-		AG2560	_
25	475.5				S75138	hypothetical prote
26	475.5		•		10	_
27	474	6.4	5291		9	_
28	472.5	6.4	1152		œ	hypothetical prote
29	471	6.4	2514		F81045	hemagglutinin/hemo

filamentous hemagg	nemopexin-neme com	probable RTX famil	hypothetical prote	hemolysin (importe	extracellular seri	outer membrane pro	hypothetical prote	hypothetical prote	hypothetical prote	hypothetical prote	hypothetical prote	hemagglutinin/hemo	hypothetical prote	ydeK protein - Esc	outer membrane pro
S21010	E64058	B85547	AH2486	AI0452	AB3528	JC1340	T17504	E90893	AB1981	C83339	D85724	T09083	AF1852	A64905	T30852
н с	7	7	7	7	7	7	~	01				~	~	~	7
									7	7	(A		• •	•	
3591	ر د 0 ہ	5188	1205	1635	2554	1651	1369	1343	1280 2	5627 2	1343 2	2273	1158	1325	1029
6.3 3591	6.3	6.3 5188		6.2 1635		6.1 1651		6.1 1343	6.1 1280 2	6.1 5627 2	6.0 1343 2	6.0 2273	6.0 1158	6.0 1325	6.0 1029
6.9	466 6.3 905	466 6.3 5188					6.1	6.1	6.1	448.5 6.1 5627 2	6.0	6.0	442.5 6.0 1158	6.0	0.9

## ALIGNMENTS

typeable

0; Gaps Query Match 98.9%; Score 7327; DB 2; Length 1477; Best Local Similarity 99.2%; Pred. No. 3.2e-291; Matches 1465; Conservative 3; Mismatches 9; Indels 0;

; 0

1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60

qq

121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180 qq óγ

181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240 οy

Оp

241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300 δ

241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300

οp

301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360 Qγ

ρp Qγ

421 SCHDLETKDNAIVDAKEMLLDFDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELK 480

0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	
4	54	09	99	72		4 4	906	96	102	108	114	120	126	132 132	138	144	
1 SGHYLSIESNAIVKTKEWLLDPDDVTIEAEDPLRNNTGINDEFPTGTGEASDPKKNSELK	1 TTLINITISNYLKNAMTMNITASRKLTVNSSINIGSNSHLILHSKGGRGGVQIDGDITS 	. KGGNLTIYSGGWVDVHKNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITG 	. EGKDFRANNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHD 	SHWNVSALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNF 	. KLKPNENMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTL 	NSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGG 	QNSSSITGNITIEKAANVTLEANNAPNOONIRDRVIKLGSLLVNGSLSLTGENADIKGN 	LTISESATFKGKTRDTLNITGNFTNNGTAEINITGGVVKLGNVTNDGDLNITTHAKRNQR 	SIIGGDIINKKGSLNITDSNNDAELQIGGNISQKEGNLTISSDKINITKQITIKKGIDGE 	DSSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTV 	TFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKT 	VNITASEKVTTTAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEA 	KSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEA 	GSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAK 	LNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTVRLRGKE 	IEVKY IQPGVASVEEVIBARRVLEKVKDLSDEBRETLAKLGVSAVRFVEPNNTITVNTQN 	EFTTRPSSQVIISEGKACFSSGNGARVCTNVADDGQP 1477 
421	481	541	601	661	721	781	841	901	961	1021	1081	1141	1201	1261	1321	1381 1381	1441
qq	Oy Dp	Qγ	oy Ob	Qy	O <sub>Y</sub>	QY Db	Qy Db	Qy Db	δ O	Qy	Oy Db	oy Ob	Qy Dp	Qy Dp	Qy Db	Qy Dp	Qy

RESULT 2 A43855

```
high-molecular-weight surface-exposed protein HWW1 - Haemophilus influenzae C; Species: Haemophilus influenzae C; Species: Haemophilus influenzae C; Date: 10-Mar-1993 #sequence_revision 18-Nov-1994 #text_change 08-Oct-1999 C; Accession: A43855 R; Barenkamp, S.J.; Leininger, E. Infect. Immun. 60, 1302-1313, 1992 A; Title: Cloning, expression, and DNA sequence analysis of genes encoding nontypeable details pertussis.

A; Reference number: A43855; MUID:92192797; PMID:1548058
                                                                                                                                                                                                   A; Accession: A4385
A; Status: preliminary
A; Molecule type: DNA
A; Residues: 1-1536 <-BAR>
A; Cross-references: GB: M84616; NID: 9475770; PIDN: AAA20527.1; PID: 9475771
A; Note: sequence inconsistent with the nucleotide translation
A; Note: sequence extracted from NCBI backbone (NCBIN: 89235, NCBIP: 89239)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           61 SIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENN 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      121 NSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNENIK 180
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             181 ARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQKIT 240
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Query Match 66.9%; Score 4957; DB 2; Length 1536;
Best Local Similarity 67.3%; Pred. No. 1.4e-194;
Matches 1046; Conservative 146; Mismatches 265; Indels 98; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               241 ISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNIV 300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     301 LSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGE 360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          361 GKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVET 420
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  421 SGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLFNNTGINDEFPTGTG-EASDPKKNSEL 479
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         480 KTTLINTTISNYLKNAWIMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDIT 539
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  540 ----SKGGNLTIYSGGWVDVHKNITLD-QGFLNITA-ASVAFEGGNNKARDAANAKIVAQ 593
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      594 GTVTITGEGKDFRANNVSLNGTGKGLNIISSVNN---LTHNLSGTINISGNITINQTTRK 650
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 591 GTIT-SGNOKGERFNNVSLNGTGSGLOFTTKRTNKYAITNKFEGTLNISGKVNISMVLPK 649
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              651 NTS-YWQTSHDSHWNVSALNLETGANFTF-IKYISSNSKGLTTQYRSSAGVNFNGVNGNM 708
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            650 NESGYDKFKGRTYWNLTSLNVSESGEFNLTIDSRGSDSAGTLTQPYNLNGISF---NKDT 706
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   SFNLKEGAKVNFKLKPNENMNTSKPLP-IRFLANITATGGGSVFFDIYANHSG----RGAE 764
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVT 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          å
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Öλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    QΩ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Qγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ά
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    qq
```

; Indels 332; Gaps 79;

Qy 765 LKMSEINI :  :	SNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDCYARNAIN 824	Quer	y Match Local Similarity 25.5%; Pre
Db 767 INSKYFNV	INSKYFNVSTGSSLRFKTSGSTKTGFSIEKDLTLNATGGNITLLQVEGTDGMIGKGIV 824	Matches	421; Conservative 235; Mismato
Oy 825 STYNISII :   : Db 825 AKKNITFE	STYNISTLGGNVTLGGONSSSITGNITIEKAANVTLEANNAPNOONIRDRVIKLGSLLV 884	Qy	2 NKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSLGVTS 61
OY 885 NGSLSLTG : : :   DD 883 SGNLTAGG	NGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVT 944 : : :	Qy	62 IPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAI-INWKQFNIDQNEMVQFLQE 118
OY 945 NDGDLNIT   : : 1 Db 943 NSKNLSIT	NDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEIQIGGNISQKEGNLTISSDK 1004   :    :	Qy Db	119 NNNSAVENRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTLDISNEN 178 :
Oy 1005 INITKOIT 	INITKQITIKKGIDGEDSSDATSNANLTIKTKELKLTEDLSISGFNKAEITAKDGRDLT 1064 	Oy Db	179 IKARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAG 236   :
Oy 1065 IGNSNDGN         :   Db 1063 IGNTNSAL	IGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESNSDNDIGLFI 1124    :  :	QY	237 QKITISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAAT 279 : ::   :
Oy 1125 TAKNVEVN               Db 1122 DAKNYTVN	TAKNVEVNKDITSLKTVNITA-SEKVTTTAGSTINATNGKASITTKT 1170         :      :      :      :	QY Db	280 IRNQGKLSADSVSKDKSGNIVL-SAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTG 338
Oy 1171 Db 1182 VTLTATEC	VTLTATEGALAVSNISGNTVTVTANSGALTTLAGSTIKGTESVTTSSQSGDIGGTISGGT 1241	Qy	339 AVIDLSGKEGGETYL-GGDERGEGKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWG- 394 :
Oy 1182 VSVSATVE           Db 1242 VEVKATES	VSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN 1241 	QY	395 DIALIDGNINAQGSGDIAKTGGFVETSGHDLFIKDNAIVDAKEWLLDFDNV 445
Oy 1242 ATEGAATI             Db 1302 ATEGAATI	ATEGAATLTATGNTLTTEAGSSITSTKGOVDLLAONGSIAGSINAANVTLNTGTLTTVA 1301             :	Qy	446 SINAEDPLENNTG-INDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNIT 501 :
Oy 1302 GSDIKATE                 Db   1362 GSNINATE	GSDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVN 1361 	Qy	502 ASRKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDITSKGGNLTIYSGGWVDVHKN 558
Oy 1362 GLNIISKI                   Db 1422 GLNIISKN	GLNIISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLG 1421 	Qy Db	559 ITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGT 615
Oy 1422 VSAVREVE 	VSAVREVEDNNTITVNTQNEETTRPSSQVIISEGRACFSSGNGARVCTNVADDGQ 1476	Qy	616 GKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHDSHWNVSALNLET 672 :::           :::             1   1   1
RESULT 3		QY	673 GANFTEIKYISSNSKGLTTQYRSSAGVNENGVNGNMSFNLKEGAKVNFKLKPNE 726 
Species: Yersin Species: Yersin Date: 02-Nov-200	02-Nov-2001	QY Db	727 NMNTSKPLPIRFLANITATGGGSVFFDIYANHSGRG 762
R;Parkhill, J.; W deno-Tarraga, A.M il, M.; Rutherford Nature 413, 523-55	N.R.; Titball, R.W.; Holden, M. T.; Cronin, A.; Davies, R.M.; Dav Skelton, J.; Stevens, K.; Whit	Qy	763 AELKMSEINISNGANFTL-NSHVRGDDAFKINKDLTINA-TNSNFSLRQ 809  :  :
A, Title: Genome Si A, Reference number A, Accession: AF03: A, Status: prelimin	A;TILLE: Genome sequence of rersina pestis, the causative agent of plague. A;Reference umber: AB0001; MUID:21470413; PMID:11586560 A;Accession: AF0394 A;Status: preliminary	Qy	810 TKDDFYDGYARNAINSTYNISILGGNVTLGGONSSSITG
A, Molecule Lype: 1 A, Residues: 1-191( A, Cross-references C, Genetics:	DNA 0 (KUR> s: GB:AL590842; PIDN:CAC92482.1; PID:g15981183; GSPDB:GN00175	Qy Dp	850NITIEKAANVTLEANNAPNQONIRDRVIKLGSLLVNGSLSLTGENADIKGN 900
A;Gene: nmwA		Qy	901 LTI-SESATFKGKTRDTLNITGNFTNNGTAEINITQGVVKLGNVTNDGDLNITTHA 955

09 146 VFLINPMCITIGKDALINFINGETASTILDISNENIKARNETEEGTKDKALAEIVNHGLITY 205 120 VIITNANGVVESGSAKVDVGSLITTTANISDEHFROGKLIPDOEONPD-ARLYNDESISY 178 206 GKDGSVNLIGGKVKNEGVISVNGGSISLLAGGKITISDIINPITTYSIAAPENBA-260 179 ARKGLAARVABSCANNGTINARLGTVAMAAGNAATIDLYGDGLUSIAYTDRYTRKPODAO 238 206 GKDGSVNLIGGKKNEGVISVNGGSISLLAGGKITISDIINPITTYSIAAPENBA-260 207 1	703 751 729 811 769 871 862 931 862 984 1044
983 1011 1042 1068 1094 1123 1183 1187 1299 1346 1359 1387 1419	inosa (strain PAO1)  change 31-Dec-2000  chang
	al protein PA4625 [imported] - Pseudomonas aeruginosa - Sep-2000 #text_con: Pseudomonas aeruginosa - Sep-2000 #sequence_revision 15-Sep-2000 #text_con: Pseudomonas aeruginosa - Sep-2000 #text_con: Pseudomonas aeruginos - Yuan, Y: Brody, L.L.; Coulter, S.N.; Folger, R.S.; Olson, M.V. S.;
Db 935 Oy 956 Db 984 Oy 1012 Db 1043 Oy 1124 Cy 1124 Cy 1124 Cy 1295 Oy 1184 Cy 1295 Cy 1295 Cy 1398 Cy 1388 Db 1420 Oy 1388 Db 1420 Oy 1388	RESULT 4 F8306B1 F90chetical C)Species: Ps C) Date: 15-Se C) Accession: R; Stover, C.K adman, S.; Nature 406, 9 A) Title: Comp A) Accession: A) Accession: A) Accession: A) Status: pre A)

178   NIKARNFTFEQTKDKALAEIVNHGLITVGKDGSVNLIGGKVKNEGVISVNGGSISLLAGQ 237   1   1   1   1   1   1   1   1   1	678 FIKYISSNSKQLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMM <sup>†</sup> TSKPLPIR 737 601 F
	RESULT 5  RESULT 5  RESULT 5  Paga 3080  Phypothetical protein PA4541 [imported] - Pseudomonas aeruginosa (strain PAO1)  C. Species 15-Sep-2000 #sequence_revision 15-Sep-2000 #text_change 31-Dec-2000  C. Accession: A83080 #sequence_revision 15-Sep-2000 #text_change 31-Dec-2000  R. Stooer, C. K.; Pham, X. O.; Erwin, A. L.; Mizoguchi, S. D.; Warrener, P.; Hickey, M. J.; Br and A. C. Sepels of S.; Yusa, Y. S.; Erody, L.L.; Coulter, S.N.; Folger, K.R.; Kas, A.; Larbig, K.; Lim, A. C. Seslon, M. J. Sepels, A. Solson, M. V.  Neture 406, 959-964, 2000  A.; Accession: A83080  A.; Accession: A83080  A.; Accession: A83080  A.; Setulus: preliminary  A.; Residues: prelimin

	qq	,
GLIGLNANASL	QY DP	363NGIQLAKKTSLEKGSTIN 
ISGNTVNVTANAGDLTVGNGAEINATEGAATLTAT	Qy Db	402 NINAQGSGDIAKTGGFVI   :     :     1410 NLGASSSVALAGAGDDILSLSGFNG
-GNTLTTEAGSSITSTRGQVDLLAQNGSIAGSINAANVT-LNTTGTLTTVAG 1302 	Qy Db	443 DNVSINAED-PLFN
SDIKATSGTLVINAKDAKLNGDASGDSTEVNAVNASGS 1340   ::  : :: :           :  ::  ::  ::  SDLRGSLMLASSHGIVNDKTSHNLGGLVGRGENTSIRSAKASGAVSGGAGIRAGGLV 1303	QV da	488 ISNYLKNAWTMNITASRKLTVNSS     : :    : :  1524 FALSADNAAAL ARATLKISDDSN
GSLEGWQALILGASAGGDVTAGYDSXIGGLVGFSTATISGASASGKVG 1351	Oy Dp	537DITSKGGNLTIY-SGGWVDVF 
	QY Db	586 ANAKIVAQGTVTITG
#sequence_revision 02-Nov-2001 #text_change 02-Nov-2001	Qy	617KGLNIISSVNNLTHNL       ::::       1697 LLANGANALLLATESGLTANRYLN
Chillingworth, T.; Cronin, A.; Davies, R.M.; Davis, P.; Dougan, G.; K.; Simmonds, M.; Skelton, J.; Stevens, K.; Whitehead, S.; Barrell, 2001	QY	669 NLETGANFTFIKYISSNSKG
ence of Yersinia pestis, the causative agent of plague. AB0001; MUID:21470413; PMID:11586360 Y	ςς Oγ	
KUR> GB:AL590842; PIDN:CAC89847.1; PID:g15979073; GSPDB:GN00175	Qy	747 GGSVFFDIYANHSGRGAELKMSEI  ::     ::  1877 TGTLGTSAVEVLGTL
8.1%; Score 602; DB 2; Length 3705; llarity 21.7%; Pred. No. 1.4e-16; Conservative 260; Mismatches 695; Indels 534; Gaps 91;	Qy	807 LRQTKDDFYDGYARNAINST 
AMLLSLGVTSIPQSVLA 68 :   :   :   STLELINATNVTGDIDA 1031	Qy	857 ANVTLEANNAPNOONIRDRVIKLG 
SGLQGMDVVHGTA-TMQVDGNKTIIRNSVDAIINWKQFNIDQNEMVQFLQENNNSAVFNR 127   :      :     ::  : : :       ::   LDLLVNGTAITSGTQGVQSAIQOGGSTVANAIHNYGLASSNSNGDSGLYVN 1082	Qy	917 LNITGNFTNNGTAEINIT-QGVVK 1::1
VTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINT 164	Oy Db	963 IGGD-IINKKGSLNITDSNNDAEI   ::  :  : : 2087 ALFDHYLTGNGTLNVAKNLATTAE
	Qy Db	1014 KKGIDGED 1
	Qy Db	1052 KAEITAKDGRDLT     :    :   2207 NWENEHPVTPPNVSLLEQDRGDIL
EIGGVISAQNQQAKGG :   :  NLNGANAAMTN	Qy	1092 ADGHNYTLNSKVKTSSSNGGR 2267 QGGYTVANATHNYGMTSNGGSGLY
1	Qy	1133 KDITSLKTVNITASE:::::::

| :| | | SESGAHQIGTDGELTVGQASNLGASSATVNLGTLTSH 1352 IIGGADTALTANNSGFL---GQYALAGNSKLTVASTN 1409 HPVTPPNVSLLEQDRGDILLELINAANVTGN----A 1636 NINGYRQTVGAVTNSGAVTLGNGGVLTSGLLTNGGI 1816 GTFGNSVTGSGVLQVTDDAEVTLTSSNGVSNAVTIDI 1469 NVAKNDASTAFDFGSTVGGAFSGIVN----LTNTT 1523 VTTVGATDR-TLHGLDLNGGTLIFDGSPPQSQANGVV 1581 :| | : | | 5 2QGGSTVANAIHNYGLTSSNGNGGSGLYVNYTLSALE 1696 NAELFGVGGLVVDAQNGALTLANGNNRYEGTTTVTAG 1756 AGTLNINGGDLAVSATNSGLSGQTHIADVASVTLTG 1876 OYALAGNSKLTVASTN---NLGASSSVALAG-AGDT 2032 VSG------KEKGGFAIVWGDIALI------DG 401 ETSGHD-----LFIKDNAIVD------AKEWLLDF 442 QIG-----GNISQKEGNLTISSDKINITKQITI 1013 GTLIFDGSPPQSQANGVVTVTDLALNSGTISITGAG 2206 VNYTLSALELLADGANALLLATESGLT---ANRELN 2323 ----KVTTTAGSTINATNGKASITTKTGDISGTIS 1178 NTGIND-----EFPTGTGEASDPKKNSELKTTLTNTT 487 SINIGSNSHLILHSKGQRGGGVQIDG------ 536 H----KNITL---DQGFLNITAASVAFEGGNNKARDA 585 I-----GNSNDGNSGAEAKTVTFNNVKDSKIS 1091 LQLIDADNVTGNANDLELMINGTTISAGQGVQSTVQ 2266 -----ESNSD-----NDTGLTITAKNVEVN 1132 EGKDFRANNV-----SLNGTG------ 616 SGTINISGNITINQTTRKNTSYWQTSHDSHWNVSAL 668 ----SSSDATSNANLTIKTKELKLTE-DLSISGFN 1051 SLTTQYRSSAGVNFNG------VNGNM 708 --KLKPN-----ENMNTSKPLPIRFLANITATG 746 NISNGANFTLNSHVRGDDAFKINKDLTINATNSNFS 806 YNISILGGNVTLGGQNSS----SSITGN-ITIEKA 856 SSLLVNGSLSLTGENADIKGNLTISESATFKGKTRDT 916 LGNVTNDGDLNITT------HAKRNQRSI 962

qq	2324	AELSGVGGLVVDAQNGALTLANGNNRYEGTTTVTAGELILGANGAFGQTSLLNIASGA-S 2382	
ζς	1179	GNTVSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTI 1218	
Zy op	1219	SGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEAGSSITSTKGQV 1271	
Zy Gp	1272	DLLAQNGSIAGSIN-AANVTLNTGTLTTVAGSDIKATSGT- 1311	
ςς Op	1312	LVINAKDAKLNGDASGDSTEVNAVNASGSGSVT 1344	
oy Op	1345 2621	AATSSSVNITGDLNTVNGLN	
oy Ob	1374	VRLRGKEIEVKYIOPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVRFVEPNNT 1433	
QY Db	1434 2739	ITVNTONEFTTRPSSQVIISEGKACFSSGNGARVCTNVADDG 1475 TFDL.SGNNTTVLAQATLKLSSGNLT-SVGNGVQNIGTLANNG 2779	
RESULT T31105 C)Specin C)Specin C)Specin C)Specin A)Ardee A)Ar	Table   Tabl	PRESULT 7  19105  Part 1055  Part 1056  Part	
7 6	233	SEVVEPHIKOLNVORGKVIIGKDGVATNGLSHFDVVAKNIEOOGKV	

QY	2	ISLLAGQKITISDIINPTITYSIAAPENEAVNLGDIFAKGGNINVRA 27° ::
QQ	279 8	SKPAKLANVTFAAG~NLTYD
QY	278 ₽	KSGNIVLSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKT 33
Dp	313	NPKKPITDNTRKDNIAISGESAGSMYGRNIKFIVT 347
ΟŊ	338	GGDERGEGKNGIQLAKKTSLEKGSTINVSG 38
qq	348	
Οy	384 F	EKGGFAIVWGD
qq	389	KDIELANNGQIHADQQLILNATGHVKLNDGSSVISNNNLGISALNLTL 436
οy	443	TNTTI 48
QQ	437 E	VTNDTKLNNLSKVSARAADLQSGNLNLDKASVLAHKLTLNISNDVSL 49
Qγ	489	SNYIK-NAWIMNITASRKITVNSSINIGSNSHLILHSKCORGGGV 532
QQ	497	NNQSKLSANNLKIKKVRDLNLNNSELSANNLTLNTSNNITLKNKSKFTAGNMTLNVTNNV 556
Qy	533 (	QIDGDITSKGGNLTIYSGGWVDVHKNITLDQGFLNITAAS 572
qq	557	NVTKNVTLNDASKLSANKLDLNVTDNVTLNSKSTLSAGE
Qy	573	VAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTG 616
QQ	611	NNLSLNASHNVTLNNKSKLSAQKADIKAVNL
Qy	617	KGLNIISSVNNLTHNLSGTI-NISGNITINQTTRKNTSYWQTSHDSHW-NV 665
qq	671	NSTTITNNGTIAGIFANITTEKLNNKEKALILAE
Qy	999	SALNLETGANFTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKE 714
qq	725 (	GDIVSKDRATVIFSKNSDFTSNGSKLVNAQNQLKVNVNNFTISQGDDITLIGNYTLN-AS 783
ΟY	715 (	GAKVNFKLKPNENMNTSKPLPIRFLANITATGGGSVFFDIXANHSGRGAELKMSEI 770
qq	784	GTFTNSGNLTTVKTLDVGDIQNFTNKGNLTVGEDLHIKSKTKTTNDGKLISIKNL 838
δλ	771	NISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYDGYARN 821
QQ	839	NISSEADFINNGTLLGIEALKIATKGNFTNKEKAILASNSLLDISVAEGKKTFNNG 894
Qy	822	AINSTYNISILGGNVTLGGQNSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGS 881
QQ	895	TIESGKNLNITNTGAFLNVDNATIRSFGVLNITSTGNVSNNGT 937
δý	882	LLVNGSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEIN-ITQGVV 938
qq	938	LISNERLNITS
ΟŊ	939	KLGNVTNDGDENITTHAKRNQRSIIGG-DIINKKGSLNITDSNNDAELQ 986
QQ	971	KQGNITNKNLIASRQQLNLTAVADNITNDSNISNKIAVLHSLGNISLNSKDQVYNLGEIY 1030
Qy	887	н
qq	1031	AGNNISVKAHQLKNDVKLMGDITTKTKECQASYKLYQASNGGHFGNDGSS-GYSEGD 1086
ΟY	1032	AEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKIS 109
qq	1087	SEII 112
QY	1092	HNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSLKTVNITASEKVTT 115
qq	1129	NRGTINVKNKLSYDSDVSFENNMQSQKVDLYTKIFEAKSDIELTFKTNGTHPVYL 1183
Qγ	1152	TAGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTT-KSGSKIEAKSGEANVTSA 1210

:   :  :	448 NAEDPLENNTGINDEFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLT 507	508 VNSSINIGSNSHLILHSKGQRGGGVQIDGDITSKGGNLTIYSGGWDVH 556 ::  :  :	557 KNITLDQGFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITGECKDFRANNVSLNGTG 616 11	617 KGLNIISSVNNLTHNLSGTINISGNITINQ 646   :	647 TTRKNTSYWQTSHDSHWNVSALNLETGANFTFKYISSNS 686 1           : : :     : :	687 KGLTTQYRSSAGVNF-NGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFLA 740	741 NITATGGGSVFFDIYANH-SGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTIN 799	800 ATNSNESLRQTKDDFYDGYGROVTL 838	839 GGONSSSITGNITIEKAANVTLEANNAPNQONIKDRVIKLG-SLLVN 885 	886GSLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGT 928	929 AEINITQGVVKLGNVTNDGDLNITTHAKRNQRSIIGGDIINKKGSLNITDSNNDAEI 985   1   1   1   1   1   1   1   1   1	986 QIGGNISQKEGNLTISSDKINITKQITIKKGIDGEDSSSDATSNANLTIKT 1036	1037 KELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGABAKTVTFNNVKDSKISAD 1093	1094 GHNVTLNSKVKTSSSNGGRESNSDNDTGLTITAKNVEVNKDITSL 1138  1	1139KT 1170   1   1   1   1   1   1   1   1   1	1171 GDISGTISGNTVSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGTIS 1219 1319 SHQNATLETGTLTINSNKDLTLSG-ANVTADSVTGNVGGSLNIASQKESDR 1368	1220GNTVNVTANAGDLTVGNGAEINATEGAATLTATGN 1254 1369 HVTVGVNVGYNHTNDPKSSQVNKTAKAGGSLLEKTIKDTIDSGIKSSTDAISDKYNSLSS 1428	1255 TLTTEAGSSITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVI 1314  : :
<b>q</b> d	AG GA	da da	Qy do	, QQ	da da	Qy	ge Db	qa Vo	da Db	QY	QY Db	QY	qa ov	Qy Db	QV Dp	QV Db	Qy	Qy
Db 1184 NFKSNNNEKKYRNSENTKNFKSIGDLINEALSDSAPEAIEAYYSGSSSNYINPVSY 1239	QY 1211 TGTIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEAGSSITSTK 1268 :	QY 1269 GQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKDAKLN-GDASG 1327 	QY 1328 DSTEVNAVNASGSGSVTAATSSSVNITGDLNIJSKDGRNIVKLRGKE 1380   11: : : :     : :	QY 1381 IEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVREVEPNN 1432 	RESULT 8 A35140 Nemolysin A precursor - Proteus mirabilis	C;Species: Proteus mirabilis C;Date: 03-May-1990 #sequence_revision 03-Aug-1990 #text_change 08-Oct-1999 C;Accession: A35140 R:Uphoff, T.S.; Welch, R.A.	independent hemolysin	A;Status: preliminary A;Molecule type: DNA A;Residues: 1-1577 <uph> A;Cross-references: GB:M30186; NID:q150888; PIDN:AAA25657 1: PID:q150890</uph>	Query Match 7.5%; Score 555.5; DB 2; Length 1577; Best Local Similarity 20.7%; Pred. No. 3.78-15; Matches 361; Conservative 257; Mismatches 606; Indels 523; Gaps 79;	ALKPLSAMILISLGVTSIPQSVLASGLQGMDVVHGTATMQVDGN 88	QY 89 KTIIRNSVDAIINWKOFNIDQNEMVQFLQENNNSAVFNRYT 129 :	ARNFTF     VGNPLF						GEVETSGHDLFIKDNAIVDAKEWLLDFDNVSI 4

QQ	1429 TIADKTGIS-DETKAKIDQGFGKVGNGIKNIVTGAEGHTANADIKVT 1474	Db 411GRASAADLTLNGRLNASGAKAGLELKAEGA 440
Qy	1315 NAKDAKLNGDASGDSTEVNAVNASGSGSVTAATSSSVNITGDLNTVNGLNIISKDGRNTV 1374 1475HVDNDAVTKTTSLTSNNDLSLNVNGS-TKLTGAEIVSQQGQV 1515	512 INIGSNSHLILHSKGQRGGCVQIDGDITSKGGNLFIYSGG  :    ::    ::
Qy Db		565 FLNITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLN   :
Oy Dp	1434 -ITVNTO 1439     :  1565 NETVNTK 1571	QY 621 IISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHDSHWNVSALNLETGANFTFIK 680 :
RESULT H83135 probabl	LT 9 35 able adhesin PA4082 [imported] - Pseudomonas aeruginosa (strain PA01)	OY 681 YISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIRFLA 740
C; Sp C; Da C; Ac R; St	C:Species: Pseudomonas aeruginosa C;Date: 15-Sep-2000 #sequence_revision 15-Sep-2000 #text_change 31-Dec-2000 C;Accession: H83135 R;Stover, C.K.; Pham, X.Q.; Erwin, A.L.; Mizoguchi, S.D.; Warrener, P.; Hickey, M.J.; Br	QY 741 NITATGGSVFFDIYANHSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINA 800
adma .; L Natu A;Ti	adman, S.; Yuan, Y.; Brody, L.L.; Coulter, S.N.; Folger, K.R.; Kas, A.; Larbig, K.; Lim, .; Lory, S.; Olson, M.V. Nature 406, 959-964, 2000 A;Title: Complete genome sequence of Pseudomonas aeruginosa PA01, an opportunistic patho	QY 801 TNSNFSLRQTKDDFYDGYARNAINSTYNISILGGNVTLGGQNSSSSITGNITIEKA-ANV 859
A; Re A; Ac A; St A; Mo	ference number: A82950; MUID:2043/33/; PMID:10984043 cession. H83135 lecule type: DNA	OY 860 TLEANNAPNQONIRDRVIKLGSLLVNGSLSLTGENADIKGNLTISESAFFKGKTRDT 916 :   :   :
A; Re A; Cr A; Ex C; Ge	A; Residues: 1-1018 <sto> A;Cros-references: GB:AE004824; GB:AE004091; NID:99950277; PIDN:AAG07469.1; GSPDB:GN001 C;Genetics:</sto>	QY 917 LNITGNFTNNGTAEINITGGVVKLGNVTNDGDLNITTHAKRNQRSIIGGDIINKKGSL 974
A; Ge		QY 975 NITDSNNDAEIQIGGNISQKEGNLTISSDKINITKQITIKKGIDGEDSSSDATSNANL 1032  1     :   :     :   :     :
Oy	TCORES 501; CONSERVALIVE 181; MISMACCNES 453; INDELS 399; CAPS 01;  1 MNKIYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLSAMLLSL 57	QY 1033 TIKTKELKLTEDLSISGFNKAEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISA 1092
gg X	GVTSI-PQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDAII-NWKQFNIDQNEM 11	QY 1093 DGHNVTLNSKVKTSSSNGGRESNSDNDFGLTITAKNVEVNKDITSLKTVNITASEKVTTT 1152
ga A	GATALAPAYALESGGTVVGGSANGEIHLSGGNSLSVNQKVDKLIANMDSFSVAAGER 10 VQFLQENNNSAVFNRVTSNQISQLKGILDSNGQVFLINPNGITIGKDAIINTNGFTASTL 17	QY 1153 AGSTINATNGKASITTKTGDISGTISGNTVSVSATVDLTTKSGSKIEAKSGEANVTSATG 1212
oy oy	VIENOPSSSSIALNRVIGTKASDIOGRIDANGQVFLVNPNGVLFGRGAQVNVGGLVASTL 16 DISNENIKARNFTFEOTKDKALAEIVNH-GLITVGKDGSVVLIGGKVKNEGVISVN 22	OY 1213 TIGGTISGNTVNVTANAGDLTVGNGAEINATEGAATLTATGNTLTTEAGS-SITSTKGOV 1271
og og	161 DITDAEFNGNSSRYRFTGPSTNGVLNHGGAITAAEGGSIALLGAQVDNKGTVLAQ 215 228 GGSISLLAGQKITISDIINPTITYSIAAPENBAVNLGDIFAKGGNINVRAAT 279 16 HGCVGLGAGSDIFINPDGNKLLDIRVDAGVANALASNGGLLAADGGRVLAAARTANALLA 275	Oy 1272 DLLAQNGSIAGS 1283 Db 973 DFKPQSHYGQIYGA 986
Qy Db	280IRNQGKLSADSVSKDKSGNIVL-SAKEGEAEIGGVISAQNQQAKGGKLMITGDKVT 334 ::  :  :  :  :  :  :  :   276 TVVNSQGAIEARSL-RGKNGRIVLDGGPDGKVMVGGALSANALNGPGHGGTVEVRGQAVE 334	RESULT 10 B99789 hemagglutinin/hemolysin-related protein [imported] - Escherichia coli (strain O157:H7
Qy	335 LKTGAVIDLSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKGSTINVSGKEKGGFAIV 392	C:Species: Escherichia coli C:Date: 18-Jul-2001 #sequence_revision 18-Jul-2001 #text_change 18-Jul-2001 C:Accession: B99789 R:Hayashi, T.: Makino, K.: Ohnishi, M.: Kurokawa, K.: Ishii, K.: Yokoyama, K.: Han, C
Qy	393 WGDIALIDGNIN-AQGSGDIAKTGGFVETSGHDLFIKDNAIVDAKEWLLDFDNVSINAED 451 1	Sniba, T.; Hattori, M.; Sninagawa, erohemorrhagic Escherichia coli Ol: 1; PMID:11258796
Qy	PLFNNTGINDEFPTGTGBASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTVNSS 51	A;Accession: B99789 A;Status: preliminary

```
A;Molecule type: DNA
*Residues: 1-126 <HAX>
A;Cross-references: GB:BA000007; PIDN:BAB34705.1; PID:g13360742; GSPDB:GN00154
A;Experimental source: strain 0157:H7, substrain RIMD 0509952
                                                                                                                                                                                                           Query Match 7.2%; Score 531.5; DB 2; Length 1268; Best Local Similarity 22.3%; Pred. No. 2.7e-14; Matches 351; Conservative 209; Mismatches 513; Indels 499; Gaps
                                                                                                                                                                                                                                                                                                                                   46 ALKPLSAMLLSLGVTSIPQSVLASGL--QGMDVVHGTATMQVDGNKTIIRNSVDAIIN-W 102
                                                                                                                                                                                                                                                                                                                                                                                                                                                     103 KQFNIDQNEMV------QFLQENNN-----SAVFNRVTSNQISQLKGILDSN 143
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        66 DNLNVDKNGVVFNNSANESSTSLAGNIQGNSNLTSGSAKVILNEVTSKNPSTINGMMEVA 125
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      144 G---QVFLINPNGITIGKDAIINTN--GFTASTLDISNENIKARNFTFEQTKDKALAEIV 198
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        199 NHGLITVGKDGSVN-----LIGGKVKNEGVISVNGGSISLLAGQKITISDIINPTI 249
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               172 NGGITTLGKLDNASPTEILSRNVVVNGKVSADELNVVAGNNYVNAAGO------V 220
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    221 TGSVSATGSRNGYSVDVAKLGGMYANKISLVSTEKGVGVRNLGVIAGGVNGVSIDSKGNL 280
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  281 LNSNAQIQSASTINLITNGTLDNTTGTVTSVGTISLNTNKNTIVNTRAGNISTMGD-IYV 339
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              250 TYSIAAPEN-----EAVNLGDIFAKGGNI--NVRAATIRNQGKLS--ADSVSKDKSGNI 299
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        300 V-----AKGGKLMITGDKVTL 335
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                336 KTGAVIDLSGKEGGETYLGGD-----ERGEGKN-GIQLAKKTSLEKGSTINVSGKEKG 387
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           340 NSGTIDNTNGKLAAAGMLAVDTNNATLINSGKGSSVGIE-AGLVALKTGTLNNSNGQIRG 398
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         399 GY-----VGLESAALN-NNNGDIQTTG------DIAIISNGNVD------430
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     388 GFAIVWGDIALIDGNINAQGSGDIAKTGGFVETSGHDLFIKDNAIVDAKEWLLDFDNVSI 447
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    448 NAEDPLFNNTGINDEFPTGTGE----ASDPKKNSELKTTLTNTTISNYLKNAWTMNITAS 503
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       431 ------NNKGL---IRSSTGHIVIGAAGSVNNGSTKTADTGSSDS-----LGIIA- 471
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     504 RKLTVNSSINIGSNSHLILHSKGQRGGVQIDGDITSKGGNLTIYSGGWVDVHKNITLDQ 563
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          564 GFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLNIIS 623
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     505 ------ DYAGKILSNSKVIIKG-----S 521
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            624 SVNNLTHNLSG----TINISGNITIN----QTTRKNTSYWQTSHDSHWNVSALNLETGAN 675
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 676 FTFIKYISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPLP 735
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  841 ONSSS-----SITGNITIEKAANVTLEANNAPNOONIRDRVIKLGSLLVNGSLSLTGEN 894
                                                                                                                                                                                                                                                                                                                                                                                              13 ALTPIAILAM ---- LSPPVASQAAGLVIKNGTVYNANGVPVVDINKP---NGSGLSHNIW 65
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         472 -----DIGVEIGAN-------NINNNGQ--IASNGNVSLSSYSTID- 504
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        577 ITM------ESMSGVNNNTALIVASKKLKINARGSIENRDGNNFGNAYGL- 620
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               736 IRFLANITATGGGSVFFDIYANHSGRGAE-LKMSEINISNGANFTLNSHVRGDDAFKINK 794
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          621 ---YFGMPQQTGGMV-----GKEGIELSGQNIYNN----NSRLIAEDG---- 656
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        795 DLTINATNSNFSLR------QTKDDFYDGYARNAINSTYNISILGGNVTLGG--- 840
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           657 PLTLQAQNTFDNTRALVTSGADASIQVGGTYYNNYA----TTWS----AGNLDIDATTL 707
                                                                                                                                                    A; Gene: ECs1282
                                                                                                                                                                                                                  Query Match
                                                                                                                                                                                                                                                                                                                                   ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                        ð
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 β
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           οp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      Dp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ò
```

```
hypothetical protein 21542 [imported] - Escherichia coli (strain 0157:H7, substrain E C.Speciess Escherichia coli (5.5peciess Escherichia coli (5.5peciess Escherichia coli (5.5peciess E8564) (5.5peciess) (5.5peciess) (5.5pecies) (5.5p
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               A; Modecule type: DNA
A; Residues: 1-1270 <STO>
A; Residues: 1-1270 <STO>
A; Cross-references: GB: AE005174; NID: g12514410; PIDN: AAG55657.1; GSPDB: GN00145; UWGP:
A; Experimental source: strain 0157:H7, substrain EDL933
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1112 RESNSDNDTGLTITAKNVEVN-KDITSLKTVNITASEKVTTTAGSTINATNGKASITTK- 1169
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1170 ----TGDĮSGTISGNTVSVSATVDLTTKSGSKIEAKSGEANVTSATGTIGGT----ISG 1220
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       992 SQKEGNLTISSDKINITKQITIKKGIDGEDSSSDATSNANLTIKTKELKLTEDLSISGFN 1051
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1052 KAEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGG 1111
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1221 -----AATLTATGNTLTTEAGS 1262
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1115 SVINYGWISGKGDVHFNVLKGTLYNRNAIAADNALTINALNGVENFK---DIVAGTALTI 1171
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1172 DTQKYVTN----NSNSNMLGQTIAINAVNDINNRGNIVGDYSLGVKTTG--NIYNYLNML 1225
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1226 SY------AVLGGFYGL 1252
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         998 ALFGITDNVGGIVGKEGVTLSA--QNVYNNNSSIIAENGPLNLLS-RGTLDNTRALLSSG 1054
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1055 ADAIIRAAGTFYNNYATTYSAGNLDVYAASLNNASDGRLEDNTATGVIASDKNLDLSVDN 1114
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1263 SIT----STKGQVDLLAQNGSI-----AGSINAANVTLNTGTLTTVAGSDIKA 1307
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1308 TSGTLVINAKDAKLNGDASGDSTEVNAVN-ASGSGSVTAATSSSVNITGDLNTVNGLNII 1366
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1367 SKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVR 1426
                                                                                                                                                                               873 -------IIDSKGNVGNNRGNLHALNGVLSVKGNNLN-NDNGEIRGYG 912
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      708 QNSSSGTMIDNNATGFIASDK--NLSLEVVNS-----LTNYGWISGKGDVDVTVNN 756
                                                                                                    895 ADIKGNLTIS-----ESATFKG--KTRD------TLNITGNFTNNGTAE-----INI 933
                                                                                                                                                                                                                                                                                                                  934 TQGVVKLGNVTNDGDLNITTHAK-RNQRSIIG-GDIINKKGSLNITDSNNDAEIQIGGNI 991
                                                                                                                                                                                                                                                                                                                                                                                                                                   817 VNDINNRGNIVSDADLNVTIKGNLYNYLYMVGYGDIALSANSV----ANNNATIEATGDL 872
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    943 ----VDNAYGL-IAGENVSVDAKSTIYNNTALIAANKKLVINAGGNLENRDGNNFLRNNG 997
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             46 ALKPLSAMILSLGVTSIPQSVLASGL--QGMDVVHGTATMQVDGNKTIIRNSVDAIIN-W 102
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Query Match 7.2%; Score 531.5; DB 2; Length 1270; Best Local Similarity 22.3%; Pred. No. 2.7e-14; Matches 351; Conservative 209; Mismatches 513; Indels 499; Gaps
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   A.Title: Genome sequence of enterchemorrhagic Escherichia coli 0157:H7.
**Reference number: A85480; MUID:21074938; PMID:11206551
A;Accession: E85649
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1427 FVEPNNTITVNT 1438
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1253 ALEANETDNTGT 1264
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      A; Status: preliminary
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              A; Gene: Z1542
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RESULT 11
                                                                                                    δ
                                                                                                                                                                                                        g
                                                                                                                                                                                                                                                                                                                                                                                                                            q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             õ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ò
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            φ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       δ
```

.. ----

Q Q	15	ALTPIAILMMLSFPVASOAAGLVIKNGTVYNANGVPVVDINKPNGSGLSHNIW 67
: :	103	1 NORTH VALVA TOND MY VANDA VALVA VA
5 Q	68	NNSA
oy 1		NETFEQTEDEALABIV 19
2	170	T. ASTRUCTION TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL
Qy Db	199	NAGLITYGKGGSVNLIGGKYKNEGYISVNGGSISLLAGGKITISDIINPTI 249
QY	250	TYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVSKDKSGNI 299
Dp	223	NKISLVSTEKGVGVRNLGVIAGGVNGVSIDSK
δy	300	VÀKGGKLMITGDKVTL 335
QQ	283	LNSNAQIQSASTINLTINGTLDNTTGTVTSVGTISLNTNKNTIVNTRAGNISTMGD-IYV 341
Qy Pr	336	KTGAVIDLSGKEGGETYLGGDERGEGKN-GIOLAKKTSLEKGSTINVSGKEKG 387
3 8	1 0	NOCITED THOURS NEW TO THE TRANSPORT OF THE TRANSPORT TO THE TRANSPORT TAIL TO THE TRANSPORT TAIL TO THE TRANSPORT TAIL TO THE TRANSPORT TAIL TO THE TRANSPORT TAIL TO THE TRANSPORT TAIL TO THE TRANSPORT TAIL TO THE TRANSPORT TAIL TO THE TRANSPORT TAIL TO THE TRANSPORT TAIL TO THE TRANSPORT TAIL TO THE TRANSPORT TAIL THE TRANSPORT THE TRANSPORT TAIL THE TRANSPORT TAIL THE TRANSPORT THE TRANSPORT THE TRANSPORT TAIL THE TRANSPORT THE TRANS
7 A	401	
οy	448	KNAWTMNITAS
Dp	433	:
ò	504	RKLTVNSSINIGSNSHLILHSKGORGGGVOIDGDITSKGGNLTIYSGGWVDVHKNITLDO 563
g q	474	
ΟŸ	564	GFLNITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLNIIS 623
QQ	507	
οy	624	SVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSHDNVSALNLETGAN 675
QQ	524	SLRNDTGGISGKQGIEVAVGGSLTNNIGVISSEEGDISLLANSVDNHGGFMMGQN 578
δy	919	SSNSKGLTTQYRSSAGVNENGVNGNMSFNLKEGAKVNFKLRPNENMNTSKPLP   :
qq	579	ITMESMSGVNNNTALIVASKKLKINARGSIENRDGNNFGNAYGL- 622
δλ	736	FLANITATGGGSVFFDIYANHSGRGAE-LKMSEINISNGANFTLNSHVRGDDAFKINK :
qq	623	YFGMPQQTGGMVGKEGIELSGQNIYNNNSRLIAEDG 658
Οy	795	DLIINATNSNFSLR
QQ	629	PLTLQAQNTFDNTRALVTSGADASIQVGGTYYNNYATTWSAGNLDIDATTL 709
Qy	841	ONSSSSITGNITIEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNGSLSLTGEN 894
Op	710	
δy	895	ADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINI 933
qq	759	GNLYNRNTIAAEKGLDIAALNGIENWKDISAGGDLTMNTNRHVTNNSNSNWYGQNIVINA 818
οy	934	TQGVVKLGNVTNDGDLNITTHAK-RNQRSIIG-GDIINKKGSLNITDSNNDABIQIGGNI 991
qq	819	VNDINNRGNIVSDADLMVTTKGNLYNYLYMVGYGDIALSANSVANNNATIEATGDL 874
οy	992	SQKEGNLTISSDKINI
qq	875	IDSKGNVGNNRGNLHALNGVLSVKGNNLN-NDNGEIRGYG 914

ΔO	1052 KA	EITAKDGRDITIGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGG 1111
g q	15	: :
οy	12	SNSDNDTGLTITAKNVEVN-KDITSLKTVNITASEKVTTTAGSTINATNGKASITTK- 11
oy oy	170	NSTITNNIALLAANKKLU INAGGNLENKUGNNFLKNNG 999 TVDLTTKSGSKIEAKSGEANVTSATGTIGGTISG 122 :      :   :
QQ	00	105
Qy	1221 1057 ADA	NTVNVTANAGDLTVGNGAEINAFEGAATLTAFGNTLFTEAGS 1262
Qy	1263 SIT  :  1117 SVT	SITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKA 1307  :
Οy	H	SGTLVINAKDAKLNGDASGDSTEVNAVN-ASGSGSVTAATSSSVNITGDLNIVNGLNII 1366
Dp	1174 DTO	COKYVTNNSNSNMLGQTIAINAVNDINNRGNIVGDYSLGVKTTGNINYLNML 1227
δλ		DGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRVLEKVKDLSDEERETLAKLGVSAVR 142
QQ ·	n i	
g G	1427 FV	FVERNITIVNI 1438 
TRESC ### ### #### ########################	RESULT 12 filamentous hemagg C;Species: Haemoph C;Species: Haemoph C;Species: Haemoph C;Accession: T31100 J;Bacceriol: 180, A;Title: Haemophil. A;Accession: T31100 A;Reference number A;Status: prelimin A;Molecule type: D A;Residues: 14152 A;Cross-references A;Gene: 1spAl Query Match Best Local Simil. Matches 399; C Oy Cy A5 LAL Oy Cy 45 LAL	RESULT 12 filamentous hemagglutinin 1 - Haemophilus ducreyi C;Species: Haemophilus ducreyi C;Species: Haemophilus ducreyi C;Species: Haemophilus ducreyi C;Species: Haemophilus ducreyi C;Species: Haemophilus ducreyi S; Accession: T3102 J. Bacteriol. 180; 6013-6022, 1998 A;Title: Haemophilus ducreyi secretes a filamentous hemagglutinin-like protein. A; Reference number: Z20984; MUID:99030326; PMID:9811662 A; Freference number: Z20984; MUID:99030326; PMID:9811663 A; Accession: T3102 A; Accession: T3102 A; Accession: T3102 A; Accession: T3102 A; Cross-references: EMBL:AF057695; NID:93929017; PID:93929018; PIDN:AAC79757.1 A; Residues: 1-4152 WARP A; Residues: 1-4162 WARP A; Residues: 1-4162 WARP A; Residues: 1-4162 WARP A; Residues: 1-4162 WARP A; Residues: 1-4162 WARP A; Residues: 1-4162 W
qq	63 LG	LGLHNHSPLKVFKGKSLSVVLLSLMPATPLLAQQNYAEALNGKVYVDSQHSSTRIY 118
oy a		RNSVDAIINWKOENIDONEMVOFLOENNNSAVENRYTSNO
QQ	<b>a</b>	NSAVFNNSRTES
QY	133 IS       167 TS	ISQLKGILDSNGQ
Qy		21

qq	227	27 TINTDREVVSTSDIIPHRENGLLSV-RNGKVTI	258
ya 4	219	9 KNEGVISVNGGSISLLAGQKITISDIINPT   ::  ::	273
a A	274	WYRAATIRNQGKLSADSVSKDKS	31.1 323
q	312	:   2 KTREATPISSGTSRTSDT	
2y Ob	324	4 GKLMITGDKVTLKTGAVIDLSGKEGGETYLGGDERGEGKNGIQLAKKTSLEKGST   :     :             :	380
λ̈́α	381	VSGKEKGGFAIVWGDIALIDGNINAQGSGDIAKTGGFVETSGHDLFIKDNAIVDAKEWL	4
qc	411		439
<u>ک</u> ۾	441	41 DEDNVSINAEDPLFNNTGINDEFPTGTGEASDPKKNSELKTTLTNTTIS : ::	489
7.7 Q0	490	90 NYLK-NAWTMNITASRKLTVNSSINIGSNSHLILHSKGQRGGGVQIDGDITSKGGNLTIY	548 553
<u>ک</u> خ	549	SGGWVD-VHKNITLDQGFLNITAASVAFE	209
a a	0.0	-	009
λ. α	608	08 NNVSLNGTGKGLNIISSVNNLTHNLSGTINISGNITINQTTRKNTSYWQTSH-DSHWNVS   :   :	666
λ 2	667	7 ALNLETGANFTFIKXISSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEG B	715
>	716	NOTITIES TO SUPPLY TO SUPPLY TO SUPPLY SUPPL	0 1
7 A	. 0	A VKNDGKLVSIENLAISSKTDFTNNGTLLGLEBAKIASGGNFTNASNGSLASNKSLDIYGN	763
λ.	758	8 H-SGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQTKDDFYD	816
q	764	4 NFTNNGTIESVKSLNITNNYTFINNATIKSYGVLNITSQGNFTNDSNGT	812
λ Q	817	7 GYARNAINSTYNISILGGNVTLGGQNSSSSITGNIT	852 872
27	853	3IEKAANVTLEANNAPNQQNIRDRVIKLGSLLVNG	886
q	873		932
λ.	æ	SLSLTGENADTRGNLTISESATFKGKTRDTLNITG	921
q	m	3 ELTLNGKFADLDNQLKVALRGKIYAGSNLTFKAKEGEKEQKSTAQAKIINRGTINVKNKL	992
ž ą	922	2 NFTNNGTAEINITQGVVKLGNVTNDGDLNITTHAKRNQRSIIGGDIINK ::	970 1052
ζ	971	KGSLNITDSNNDAEIQIGGNISQKEGNLJISSDKINITKQITIKKGID	1018
ą	1053		1112
<u>λ</u> .	1019	-GEDSSSDATSNANLTIKTKELKLT-EDLSISGFNKAEITAKDGRDLTIG	1.066
ō	1113	FGPNWNDLTTTNNDTTINDKWNQLKLKWEKFKNNGENNHSINLNIYPADEGVEKAKIFAG	1172
۸.	1067	NSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTSSSNGGRESN :  :	1115

```
1173 VLRNGTNGVEDKVYQELNDKAKKEYEDKFAKKFQGRFKSRFQNGEFDWAGDWAKEGNESY 1232
                                                          1116 SDNDTGLTITAKNVEVNKDITSLKTVNITASE-KVTTTAGSTIN------- 1158
                                                                                                       1233 GSKET-----EEKYNGIKKEHTVNIGKHEIKVPTVSFENLNNINHQODKSDGIDKSI 1284
                                                                                                                                                                            1159 -----SITT 1168
                                                                                                                                                                                                                                              1285 ISELLAQPIYVAKADVPDVDPRVAQNDKAVDEDGLYRTRLSYINQNNYLGAKYFFNQLDT 1344
                                                                                                                                                                                                                                                                                                     1169 KTGDISG-----SATV---DLT 1191
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1345 EDDKLKGIKRIGDNYFEHQLITRLIEKVADNHLTLKHGLHDIALVKKLIDSASIQAKDLN 1404
                                                                                                                                                                                                                                                                                                                                                                                                                    1192 TKSGS-----ATGTI-- 1214
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1215 ------GGTISGNTVNVTA----NAGDLTVGNGAEINATEGAATLTATGNTLT 1257
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1465 GIIDVKVDDVRNTGTIAGYAVGLEAKNKLKNTGDIL---SQRLSKLVGKKGLESTGVTYV 1521
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1522 DETGATKVRKARIKSEGHIYLETDKDKNVDLTASELKGNTGQIKAKDLNLNDIYETSYKY 1581
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             1272 ---DLLAQNG------ 1294
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1582 KYEKLFGKNGGEIGDRVTQTSQAKSVGTDASFDHLHLSLEGDVNQTGSNLKANRTTGVVK 1641
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1295 GTLTTVAGSDI-----KATSGTLVINAKDAKLNGDASGDSTEVNAVNASGSGSVTAATS 1348
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      1642 GDFNTKAGKDLFHRQIDTVTSGT--VYSASASGGGQSAGISLTDQGVETYTNKTATAGAN 1699
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1349 SSV-------NITGDLNTVNG-LNIISKDGRNTVRLRGKEIEVKYIQPGVAS 1392
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1700 ADVINFMKRIRETETSLIHRNSEFNALSGELYVMGKADIGGVDI-NRDVEV----IKT 1752
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1393 VEEVIEAKRVLEKVKDL---SDEERETLAKLGVSAVRFVEPNNTITVNTQNEFTTRPSSQ 1449
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              1405 LKVGEALTKEOKDNLKEDIVWYVKTEVNAQEVLVPQVYLAKQTIEEVEKQRGVGTGQIRA 1464
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1753 PEEIAAEOKAAEEAKKAEVKENEASETAAK-----ETEEAENDNVAEKDKTKPKFK 1803
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1450 VIISE 1454
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1804 KLTDE 1808
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 QQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           рp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          Op
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 òλ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   δy
```

hemagglutinin/hemolysin-related protein NMB0497 [imported] - Neisseria meningitidis (

C.Species: Neisseria meningitidis C.Date: 31-Mar-2000 #sequence\_revision 31-Mar-2000 #text\_change 19-Jan-2001 C.Accession: B81192 R.Tettelin, H.; Saunders, N.J.; Heidelberg, J.; Jeffries, A.C.; Nelson, K.E.; Elsen, Hickey, E.K.; Haft, D.H.; Salzberg, S.L.; White, O.; Fleischmann, R.D.; Dougherty, B. T., H.; Oin, H.; Vamathevan, J.; Gill, J.; Scarlato, V.; Masignani, V.; Pizza, M. Science 287, 1809-1815, 2000 A.Authors: Grandl, G.; Sun, L.; Smith, H.O.; Fraser, C.N.; Moxon, E.R.; Rappuoll, R.; A.Title: Complete genome sequence of Neisseria meningitidis serogroup B strain MC58.

A; Accession: B81192

A;Status: preliminary A;Status: preliminary A;Motecule type: DNA A;Residues: 1-1975 <TET> A;Cross-references: GB:AE002406; GB:AE002098; NID:g7225720; PIDN:AAF40929.1; PID:g722 A;Experimental source: serogroup B, strain MCS8

A; Gene: NMB0497

Query Match 7.0%; Score 520; DB 2; Length 1975; Best Local Similarity 22.7%; Pred. No. 1.4e-13; Matches 384; Conservative 227; Mismatches 551; Indels 528; Gaps

δy			52
QQ	1 MNK	:: :    : : :   :  MNKGLHRIIFSKKHSTWVAVAETANSQCKGKQAGSSVSVSLKTSGDLCGKLKTTLKTLVC 6	09
Qy	53 MLL	SLGVTSIPQSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDA	86
qq	61 SLV	SLSMVLPAHAQITTDKSAPKNQQVVILKTNTGAPLVNIQTPNGRGLSHN	112
Οy	Η		
ДQ	113R	DVII	170
οy	149 INF	INPNGITIGKDAIINTNOFTASTLDISNENIKARNFTFEQTKDKALAELVNHGLIT 2	204
рр	171 ANE	TGAP	196
οy	205 -VG	NLIGGKVKNEGVISVNGGSISLLAGQKITIS	242
QQ	197 QiG	IG	253
οy	243	DSVSK	293
QQ	254 PQK	PQKVDYASGEISAGTAAGTKPTIALDTAALGGDSITLIANEKGVGVKNAGTLEA 3	307
Qy	294 DKS	IGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYL	353
qq	308		339
Qy		QLAKKTSLEKGSTINVSGKEKGGFALVWG-DIALLDGNINAQGSGDIA	412
Dp	340 SIE		386
οy	413 KTC	WLLDFDNVSINAEDPLFNNTGIND-EFPTGT	467
QQ	387 RP#	RPATIVLNAGHNLVIESKINVNNAKGPATLSADGRIVIKEASIQIGI	433
δy	468 GE		510
qa	434 TV)	TVYSSSKGNAELGNNTRITGADVTVLSNGTISSSAVIDAKDTAHIEAGKPLSLEASTVTS	493
٥y	511 SIN	HLILHSKGQRGGGVQIDGDITSKGGNLTIYSGGWVDVHKNITLDQG	564
QQ	494 DIE	TNLNTPGNLYVHTG KDLNLNVDKD	544
Οy	565 FLNI	TAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLNIISS	624
qq	545		585
٥y	625 VN	TTRKNTSYWQTSHDSHWNVSALNLETGANFTFIKY	681
qq	5861	HIQAAKGNIQL-RNTKLNAAKALETTA	620
Qγ	682 IS	SSNSKGLTTQYRSSAGVNFNGVNGNMSFNLKEGAKVNFKLKPNENMNTSKPL	734
Dp	621 LQC	HAVSADGHVSLLANGNADFTGHNTLTAKA-	629
Qy	735 PII	NSHVRGDDAFKINK	794
qq	099		683
Oy	795 DLT	INATINSNESLRQTKDDFYDGYARNAINSTY-NISILGGNVTLGGQN-SSSSITGNIT	852
qq	684 DI	LVAGNGIQLGDGKQRNSINGKHISIKNNGGNADLKNLNVHAKSGALNIH	735
φý	853 IE		883
QQ	736 SDI	HITHLNAQHERVTLNQVDAYAHRHLSITGSQIWQNDKLPSANKLV	795
Qy St			941
a :	/ 90 AIN	THE WOOD THE WOOD TO SHARE THE WOOD TO SHARE THE	700

```
R;Parkhill, J.; Wren, B.W.; Thomson, N.R.; Titball, R.W.; Holden, M.T.G.; Prentice, M. deno-Tarraga, A.M.; Chillingworth, T.; Cronin, A.; Davies, R.M.; Davis, P.; Dougan, G. il, M.; Rutherford, K.; Simmonds, M.; Skelton, J.; Stevens, K.; Whitehead, S.; Barrel Nature 413, 523-527, 2001
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        A;Residues: 1-2535 <KUR>
A;Cross-references: GB:AL590842; PIDN:CAC91295.1; PID:915980484; GSPDB:GN00175
C;Genetics:
A;Gene: YP02490
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1301 RADAKIILKGIVNRIQSEEKLETNSTVWQKQAGRGSTIETLKLPSFESPTPPKLTAPGGY 1360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     probable hemolysin YPO2490 [imported] - Yersinia pestis (strain CO92) C;Species: Yersinia pestis (c;Pate: 02-Nov-2001 #sequence_revision 02-Nov-2001 #text_change 02-Nov-2001 C;Accession: ACO304
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    A,Title: Genome sequence of Yersinia pestis, the causative agent of plague. A,Reference number: AB0001; MUD:21470413; PMID:11586360
A,Accession: AC0304
A,Status: preliminary
A,Molecule type: DNA
                                                                                                                                                                                  1051 NK-----AEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKV 1103
                                                                                                                                                                                                                                   952 SNYFPTQKAAELNQK-SKELEQQIAQLKKSSPKSKLIP--TLQEERDRLAFYIQAINKEV 1008
                                                                                                                                                                                                                                                                                                                             1158 ----DISGTISG---- 1179
                                                                                                                                                                                                                                                                                                                                                                                                                                            1066 AAILIDGITDQYEIGKPTYKSHYDKAALNKPSRLTGRTGVSIHAAAALDDARIIIGASEI 1125
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1180 ----NTVSVSATVDLTTKSGS-----KIEAKSG-------EANV 1207
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1126 KAPSGSIDIKAHSDIVLEAGONDAYTFLKTKGKSGKIIRKTKFTSTRDHLIMPAPVELTA 1185
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  1208 TSATGTIGGTISGNTVNVTANAGDLTVGNGAEIN--ATEG----AATLTATGNTLTTEAG 1261
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1262 SS-----ITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVIN 1315
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1316 AKDAKL-----NGDASGDSTEVNAV---NASGSGSV--TAATSSSVNITGDLNTVNGLN 1364
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1365 I--ISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRV----LEKVKDLSDEERETLA 1418
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           993 QKEGNLTISSDKINITKQITIKKGIDGEDS--SSDATSNANLTIKTKELKLTEDLSISGF 1050
                                                                                                                                                                                                                                                                                        1104 KTSSSNG-----GRESNSDNDTGLTITAKNVEVN-KDITSLKTVNITASEKVTTTAGSTI 1157
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Query Match 7.0%; Score 520; DB 2; Length 2535; Best Local Similarity 19.7%; Pred. No. 1.9e-13; Matches 385; Conservative 272; Mismatches 656; Indels 642; Gaps
|: | :: | :: | :: | 833 NI-NWSTVSTKTLEDNAELKPLAGRINIEAGSGTLTIEPANRISAHTDLSIKTGGKLLLS 891
                                                                                                                              892 AKGGNAGAPSAQVSSLEAKGNIRLVTGETDLRGSKITAGKNLVVATTKGKLNIEAVNNSF 951
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1 MNK-IYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVRHLALKPLS-AMLLSLG 58
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                59 VTS-----IPQSVLASGLQGMDVV---HGT-------ATMQVDGNKTI 91
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1419 KLGVSAVRFV 1428
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1415 RAGAAIVTII 1424
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  Д
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          δy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         οy
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             g
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Db
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ŏ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     g
                                                                                                                                                                                                                                                                                                                                               qq
                                                                                                                                                                                                                                                                                                                                                                                                                                                        pp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            òγ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ΩD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  δ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        QΥ
                                                                                                                                                                                                                                      qq
                                                                                                                                                                                                                                                                                                 οy
                                                                                                                                                                                                                                                                                                                                                                                                       òγ
```

Tue Mar 25 08:37:46 2003

Db	65 CVSLSVQAAIVADASAPGNQQPTIINSANGTPQVNIQAPSSGGVSRNVYSQEDVDGRGVI 124	
Qy	92 IRNSVDAIINWKQFNIDQNEMVQFLQENNNSAVFNRVTSNQISQLKGILDSNG-144	
Dp 1	125 LNNGHGVNQTELGGFIDGNPWLARGEASIILNEVNSRDPSKLNGYIEVAGR 175	
0y 1	6	
	. –	
Db 2	:     :	
0y 2	25	
Db 2	96 MYAGKIRLIGTESGV	
0y 2	09	
Dp 3		
Qy 3	303 AKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGG 349	
Dp 4	413 SGTLSVEASGKITAQGKNISGTAQRFTAHRLDLSGSQTQSRDITLIAQGGEIDLTGAE 470	
Qy 3	350 ETYLGGDERGEGKNGIQLAKKTSLEKGSTINVSGK 384	
Db 4	οī	
ОУ 3	385 EKGGFAIVWGDIALIDGNINAQGS 408	
Dp 2	529 NRGGTLLSSGTLSLQAESLNSNGNSLLGAGVQSDGRLTEIGDLRVTTRQDLIAHGQTLAA 588	
	-	
0y 4	462 EFPTGTGEASDPKKNSELKTTLTNTTISNYLKNAWTMNITASRKLTVNSSINIGSNSH 519	
9 qa	646TLAGNTLALDLGQFDNQGQQYTASQDLTIDLQRDFSH 682	
Oy 5:	520 LILHSKGORGGGVQIDGDIT-SKGGNLTIYSGGWVDVHKNITLDQGFLNITAASVA 574	
Dp qa	683QAGSTLQAGRDLTLTSLGAVTNDGQLVAGGTLSTHSDSLLNSGNLIATQAELN 735	
Qy 57	5 FE	
7. da	36 ATGALINHGEILTLGGLDTDSNTLFNTGSIISAEATLNARERITNSGPDALIGATDENGT 795	
οу 6.	16 GKGL-NIISSVNNLTH	
Dp 43	96 LALLAPVIENSDIVIHIDIAPITIILGMGTVILAGGHARDGHYASAAQVLNLSGLIESGK 855	
Qy 64	-	
38 qa	56 DMLIYATTLINSRHILTANTDFIVADTVTGTAVWTAENPDIPGGRYAEPPDGGADNSDYI 915	
0у 66	0 -DSHWNVSALNLETGANFTFIKYIS	
T6 qa	16 GTEYTSVIAYNGIDQISPEAQLLAGGNLTPQVGTLENFWSKVSAQGEIDLTGVTLQQDGW 975	
δy 65	93SFNLXE 714	
Db 97	976 GDQQRLMEQTISSGVWRYRTYKGGLWTREWGPEVSERATSEXASSFTAKTLSGSGTTINN 1035	
Qy 71:	5	
Db 103	6 GANPGAIAPPADRDNSGKDLAVEFNGISLTQPNGGLY(	
Qy 75	8 -HSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLTINATNSNFSLRQT 810	

KDDFYDCYARN-AINSTYNISILGGNYTLGGONSSSSITGNITIEKAANYTLEANNAPNO  (C)	A HO O THE IN TO SEE STANDING THE SEE SEE SEE SEE SEE SEE SEE SEE SEE S	1096 L 811 K 1150 Q 870 Q 1199 T 1258 N 1258 N 1258 N 1258 N 1307 Q 1022 S 1355 L 1077 A 1077 A
---	---	--

Gallota de la complete de protein NMB1779 (imported) - Neisseria meningitidis (CiSpecies: Neisseria-meningitidis de CiSpecies: Neisseria-meningitidis serogroup Batrain MCS8. All de Cispecies: Neisseria-meningitidis serogroup Batrain MCS8. All de Cispecies: Dallota de CiSpecies: Neisseria-meningitidis de Ci

us-10-092-880-4.rpr

A; Experimental source: serogroup B, strain MC58 C; Genetics:
A; Gene: NMB1779
Ouery Match
7.0%: Score 517 5: Di

87; 113 --RYTQFDVDNKGAVLNNDRNNNPFVVKGSAQLILNEVRGTASKLNGIVTVGGQKADVII 170 :| | : | : | : | : | | : | 346 TTEKGAAG-----TFISNGGRI-----ESKGLLVIETGEDISLRNGAV-VQNNG--SRPA 392 548 LSAASIHLKSDN-----AAH------ITGTSKTLTASK-DMGVEAGSLNVTNT--N 589 856 A---ANVTLEA--NNAPNQONIR-------DRVIKLGSLLVNG 886 61 SLVSLSMVLPAHAQITTDKSAPKNQQVVILKTNTGAPLVN----IQTPNGRGLSHN---- 112 99 IINWKQFNIDQNEMVQFLQENNNSAVFN---RVTSNQI----SQLKGILDSNGQ----VFL 148 149 INPNGITIGKDAIINTNGFTASTLDISNENIKARNFTFEQTKDKALAEIVNHGLIT---- 204 205 -VGKDGSVNLIGGKVKNEGVISV-----NGG-----SISL---LAGQKITIS-- 242 197 QIGKDGA - LIGFDVR-QGILIVGAAGWNDKGGADYIGVLARAVALQGKLQGKLQGKNLAVSIG 253 243 ----DIINPTITYSIAAPENEAVNLGDIFAKGGNINVRAATIRNQGKLSADSVS--KDKS 296 254 POKVDYASGEISAGTAAGTKPTIAL-DTAALGG--------MYADSITLIANEK 298 297 GNIVLSAKEGEAEIGGVISAQNQQAKGGKLMITGDKVTLKTGAVIDLSGKEGGETYLGGD 356 299 GVGVKNAGTLEAAKQLIVTSSGRIENSGRIATTAD------GTEASPTYLSIE 345 357 ERGEGKNGIQLAKKTSLEKGSTINVSGKEKGGFAIVWG-DIALIDGNINAQGSGDIAKTG 415 416 GFVETSGHDLFIKDNAIVDAKEWLLDFDNVSINAEDPLF----NNTGIND-EFPTGTGEA 470 393 TTVLNAGHNLVIESKTNVN-------NAKGPATLSADGRTVIKEASIQTGTTVY 439 471 SDPKKNSEL-----TVTTLTNTTISN--YLKNAWTMNITASRKL-----TVNSSIN 513 440 SSSKGNAELGNNTRITGADVTVLSNGTISSSAVIDAKDTAHIEAGKPLSLEASTVTSDIR 499 514 IGSNSHLILHSKGQRGGGVQIDGDITSK-----GGNLTIYSGGWVDVHKNITLDQGFLN 567 568 ITAASVAFEGGNNKARDAANAKIVAQGTVTITGEGKDFRANNVSLNGTGKGLNIISSVNN 627 628 LTHNLSGTINI---SGNITINQTTRKNTSYWQTSHDSHWNVSALNLETGANFTFIKYISS 684 590 LRTN-SGNLHIQAAKGNIQL-RNTKLN-------AAKALETTA-----LQG 626 N--SKGLTTQYRSSAGVNFNG-----VNGNMSFNLKEGAKVNFKLKPNENMNTSKPLPIR 737 627 NIVSDGL-----HAVSADGHVSLLANGNADFT------GHNTLTAKA---- 662 738 FLANITATGGGSVFFDIYANHSGRGAELKMSEINISNGANFTLNSHVRGDDAFKINKDLT 797 663 ------DVNAGSVGKG-RLKADNTNITSSSG-------DIT 689 798 INATNSNFSLRQTKDDFYDGYARNAINSTY-NISILGGNVTLGGQN-SSSSITGNITIEK 855 Ouery Match 7.0%; Score 517.5; DB 2; Length 1995; Best Local Similarity 22.8%; Pred. No. 1.8e-13; Matches 385; Conservative 228; Mismatches 555; Indels 519; Gaps 1 MNK-IYRLKFSKRLNALVAVSELARGCDHSTEKGSEKPARMKVR------HLALKPLSA 52 53 MLLSLGVT-----SIP---QSVLASGLQGMDVVHGTATMQVDGNKTIIRNSVDA 98 Dp ò qq δŏ Q  $^{\mathrm{pp}}$ qq qq Qγ Ω Db δ ò d ò δ δ Dp ö g ò Dp δ Dp δ QQ Ω qq

958 FPTQKAAELNQK-SKELEQQIAQLKKSSPKSKLIP--TLQEERDRLAFYIQAINKEVKGK 1014 1015 KPKGKEYLQAKLSAQNID---LISAQGIEISGSDITASKKLNLHAAGVLPKAADSEAAAI 1071 1158 -----DISGTISG----- 1179 1180 -NTVSVSATVDLTTKSGS------KIEAKSG------EANVTSA 1210 1307 AKIILKGIVNRIQSEEKLETNSTVWQKQAGRGSTIETLKLPSFESPTPPKLTAPGGYIVD 1366 996 GNLTISSDKINITKQITIKKGIDGEDS--SSDATSNANLTIKTKELKLTEDLSISGFNK- 1052 1053 -----AEITAKDGRDLTIGNSNDGNSGAEAKTVTFNNVKDSKISADGHNVTLNSKVKTS 1106 1107 SSNG-----GRESNSDNDTGLT1TAKNVEVN-KDITSLKTVNITASEKVTTTAGST1--- 1157 1211 TGTIGGTISGNTVNVTANAGDLTVGNGAEIN--ATEG----AATLTATGNTLTTEAGSS- 1263 1264 ----ITSTKGQVDLLAQNGSIAGSINAANVTLNTTGTLTTVAGSDIKATSGTLVINAKD 1318 1319 AKL----NGDASGDSTEVNAV---NASGSGSV--TAATSSSVNITGDLNTVNGLNI-- 1365 1366 ISKDGRNTVRLRGKEIEVKYIQPGVASVEEVIEAKRV----LEKVKDLSDEERETLAKLG 1421 1132 SGSIDIKAHSDIVLEAGQNDAYTFLKTKGKSGKIIRKTKFTSTRDHLIMPAPVELTANGI 1191 898 GNAGAPSAQVSSLEAKGNIRLVTGETDLRGSKITAGKNLVVATTKGKLNIEAVNNSFSNY 957 987 SLSLTGENADIKGNLTISESATFKGKTRDTLNITGNFTNNGTAEINITQG--VVKLGNVT 944 945 NDGDLNITTHAKRNQRSIIGGDIINKKGSLNIT------DSNNDAEIQIGGN--ISQKE 995 838 NWSTVSTKTLEDNAELKPLAGRLNIEAGSGTLTIEPANRISAHTDLSIKTGGKLLLSAKG 897 1422 VSAVRFV 1428 1421 AAIVTII 1427 g g pp g qq οy οy δ ŏ Q δ qq οy g q ò

Search completed: March 24, 2003, 15:24:34 Job time: 52 secs

		•		
•				
	•		•	
			•	